Nursing level-IV

Preventing and Managing Common Communicable and Neglected Tropical Diseases
Based on Dec, 2018 Version OS and Dec, 2019 Version Curriculum

Module Title:- **Providing care in the pre/post and Intra**

Operative nursing

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LG #4	LO #1- APPLY GENERAL PRINCIPLES OF PREVENTION AND CONTROL

Instruction sheet

This learning guide is developed to provide you the necessary information regarding the following content coverage and topics:

- Apply general principles of prevention and control
  - ✓ Introduction to communicable disease
  - ✓ Common communicable Diseases
  - ✓ Neglected tropical diseases
  - ✓ Preparing plan
  - ✓ Designing strategies to resolve health problems
  - ✓ Identifying most at risk population(MARPS)
  - ✓ Diseases prevention and control measures
  - ✓ Factors for the transmission of communicable diseases
  - ✓ Natural history of communicable diseases
  - ✓ Defining common communicable diseases, etiology, clinical manifestations and diagnostic approaches
  - ✓ Common myths of common communicable disease in the community
  - ✓ Compiling, reporting and documenting activities

This guide will also assist you to attain the learning outcomes stated in the cover page. Specifically, upon completion of this learning guide, you will be able to:

- *Identify Common communicable Diseases*
- *Define Neglected tropical diseases*
- *Design strategies to resolve health problems*
- *Identify most at risk population (MARPS)*
- *Explain Diseases prevention and control measures*
- *Discuss on factors for the transmission of communicable diseases*

- *Explain Natural history of communicable diseases*
- *Define common communicable diseases, etiology, clinical manifestations and diagnostic approaches*
- *Identify Common myths of common communicable disease in the community*

Learning Instructions:

1. Read the specific objectives of this Learning Guide.
2. Follow the instructions described below.
3. Read the information written in the “Information Sheets”. Try to understand what are being discussed. Ask your trainer for assistance if you have hard time understanding them.
4. Accomplish the “Self-checks” which are placed following all information sheets.
5. Ask from your trainer the key to correction (key answers) or you can request your trainer to correct your work. (You are to get the key answer only after you finished answering the Self-checks).
6. If you earned a satisfactory evaluation proceed to “Operation sheets
7. Perform “the Learning activity performance test” which is placed following “Operation sheets” ,
8. If your performance is satisfactory proceed to the next learning guide,
9. If your performance is unsatisfactory, see your trainer for further instructions or go back to “Operation sheets”.

INFORMATION SHEET 1- APPLY GENERAL PRINCIPLES OF PREVENTION AND CONTROL

1.1. Definition of communicable diseases:

Communicable disease is an infectious disease that can be transmitted from one individual to another either directly by contact or indirectly by fumets and vectors. It can also be defined as illness caused by microorganism and transmitted from an infected person or animal to another person or animal. Communicable or infectious disease is an illness caused by transmission of a specific agent or its toxic products from an infected person or animal to a susceptible host either directly or indirectly through an intermediate animal host or inanimate environment. Disease burden due to communicable disease is massive and these diseases cause heavy mortality, disability and economic loss to the country. Health workers have an important role to play in the control of these diseases by applying effective and efficient management, prevention and control measures. Health workers need to be equipped with capacity to target communicable diseases for eradication.

1.2. The Burden of the Common Communicable Diseases:

Communicable diseases are the main cause of health problems in Ethiopia. According to the Ethiopian Federal Ministry of Health, communicable diseases accounted for most of the top ten causes of illness and death in 2004 EFY.

Table 1.1 Top 10 leading causes of outpatient visits in most regions of Ethiopia, September 2008–August 2009.

Rank	Diagnosis	Percentage
1	Malaria (clinical diagnosis without laboratory confirmation)	8.3
2	Acute upper respiratory infections	8.1
3	Dyspepsia (indigestion)	5.9
4	Other or unspecified infectious and parasitic diseases	5.0
5	Pneumonia	4.8
6	Other or unspecified diseases of the respiratory system	4.0
7	Malaria (confirmed with species other than Plasmodium falciparum)	3.7
8	Diarrhoea with blood (dysentery)	3.7
9	Helminthiasis (caused by worms)	3.5
10	Diseases of the musculoskeletal system and connective tissue	3.0
Total % of all causes of outpatient visits		**47.2**

Table 2 Top 10 leading causes of inpatient deaths in most regions of Ethiopia, September 2008–August 2009.

Rank	Diagnosis	Percentage of all inpatient deaths
1	Pneumonia	12.4
2	Other or unspecified effects of external causes	7.1
3	Tuberculosis	5.1
4	Human immunodeficiency virus (HIV) disease	3.9
5	Anemias	3.7
6	unspecified diseases of the circulatory system	3.5
7	Hypertension (high blood pressure) and related diseases	3.1
8	Malaria (clinical diagnosis without laboratory confirmation)	2.5
9	Malaria (confirmed with Plasmodium falciparum)	2.3
10	Road traffic injuries	2.3
Total % of all causes of inpatient deaths		50.8

- **Ethiopia Top 10 Causes of Death (global health - Ethiopia, 2018**)

1 Neonatal disorders
2 Diarrheal diseases
3 Lower respiratory infections
4 Tuberculosis
5 Ischemic heart disease
6 Stroke
7 HIV/AIDS
8 Cirrhosis
9 Meningitis
10 Protein-energy malnutrition

Source: GBD Compare 2018, Cameroon

1.3. Definition of terms (epidemic, endemics, prevalence, incidence)

- Health- The most ambitious definition of health is that proposed by WHO in 1948: "Health is a state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity"
- Disease: The term disease broadly refers to any condition that impairs normal function.
- Epidemics - the occurrence of any health related condition in a given population in excess of the usual frequency in that population.
- Endemic - a disease that is usually present in a population or in an area at a more or less
- Sporadic - a disease that does not occur in that population, except at occasional and irregular intervals.
- Pandemic - an epidemic disease which occurs worldwide
- Infection - the entry and development or multiplication of an infectious agent in the body
- Contamination – presence of living infectious agent upon articles

- Infestation – presence of living infectious agent on the exterior surface of the body
- Infectious - caused by microbes and can be transmitted to other persons.
- Vector-An arthropod which transfers an infectious agent from a source of infection to a susceptible host
- Carrier- A person or animal that harbors a specific infectious agent in the absence of discernible clinical disease and serves as a potential source of infection

SELF-CHECK -1	WRITTEN TEST

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

1. the occurrence of any health related condition in a given population in excess of the usual frequency in that population is(1)

   A. Endemic C. Sporadic

   B. Epidemics D. Pandemic

2. presence of living infectious agent on the exterior surface of the body(1)

   A. Carrier C. Vector

   B. Infectious D. Infestation

Note: **Satisfactory rating - 2 points** **Unsatisfactory - below 2 points**

2.1. Communicable Diseases

These are illnesses due to specific infectious agents or its toxic products, which arise through transmission of that agent, or its toxic products from an infected person, animal or inanimate reservoir to a susceptible host, either directly or indirectly, through an intermediate plant or animal host, vector or inanimate environment.

Chain of Disease Transmission

This refers to a logical sequence of factors or links of a chain that are essential to the development of the infectious agent and propagation of disease. The six factors involved in the chain of disease transmission are:

a. Infectious agent (etiology or causative agent)

b. Reservoir

c. Portal of exit

d. Mode of transmission

e. Portal of entry

f. Susceptible host

A. Infectious agent: An organism that is capable of producing infection or infectious disease. On the basis of their size, etiological agents are generally classified into:

- Metazoan (cellulamultir organisms). (E.g. Helminthes). ƒ Protozoa (Unicellular organisms) (e.g. Amoeba)
- Bacteria (e.g. Treponema palladium, Mycobacterium tuberculosis, etc.)
- Fungus (e.g. Candida albicans)
- Virus (e.g. Chickenpox, polio, etc.)

B. Reservoir of infection: Any person, animal, arthropod, plant, soil or substance (or combination of these) in which an infectious agent normally lives and multiplies, on which it depends primarily for survival and where it reproduces itself in such a manner that it can be transmitted to a susceptible host**.**

Types of reservoirs

1. Man: There are a number of important pathogens that are specifically adapted to man, such as: measles, smallpox, typhoid, meningococcal meningitis, gonorrhea and syphilis. The cycle of transmission is from human to human.

2. Animals: Some infective agents that affect man have their reservoir in animals. The term “zoonosis” is applied to disease transmission from animals to man under natural conditions. For example:

- Bovine tuberculosis - cow to man
- Brucellosis - Cows, pigs and goats to man
- Anthrax - Cattle, sheep, goats, horses to man
- Rabies - Dogs, foxes and other wild animals to man

Man is not an essential part (usual reservoir) of the life cycle of the agent.

3. Non-living things as reservoir: Many of the agents are basically saprophytes living in soil and fully adapted to live freely in nature. Biologically, they are usually equipped to withstand marked environmental changes in temperature and humidity.

E.g. Clostridium botulinum etiologic agent of Botulism
Clostridium tetani etiologic agent of Tetanus
Clostridium welchi etiologic agent of gas gangrene

C. Portal of exit (mode of escape from the reservoir): This is the site through which the agent escapes from the reservoir. Examples include:

- GIT: typhoid fever, bacillary dysentery, amoebic dysentery, cholera, ascariasis, etc.
- Respiratory: tuberculosis, common cold, etc.
- Skin and mucus membranes: Syphilis

D. Mode of transmission (mechanism of transmission of infection): Refers to the mechanisms by which an infectious agent is transferred from one person to another or from a reservoir to a new host. Transmission may be direct or indirect.

1. Direct transmission: Consists of essentially immediate transfer of infectious agents from an infected host or reservoir to an appropriate portal of entry. This could be

a. Direct Vertical Such as: Trans placental transmission of syphilis, HIV, etc.

b. Direct horizontal;- Direct touching, biting, kissing, sexual intercourse, droplet spread onto the conjunctiva or onto mucus membrane of eye, nose or mouth during sneezing coughing, spitting or talking; usually limited to a distance of about one meter or less.

2. Indirect transmission

a. Vehicle-borne transmission: Indirect contact through contaminated inanimate objects (fomites) like:

- Bedding, toys, handkerchiefs, soiled clothes, cooking or eating utensils, surgical instruments.
- Contaminated food and water
- Biological products like blood, serum, plasma or IV-fluids or any substance serving as intermediate means by which an infectious agent is transported and introduced into a susceptible host through a suitable portal of entry. The agent may or may not multiply or develop in the vehicle before it is introduced into man.

b. Vector-borne transmission: Occurs when the infectious agent is conveyed by an arthropod (insect) to a susceptible host

1. Mechanical transmission: The arthropod transports the agent by soiling its feet or proboscis, in which case multiplication of the agent in the vector does not occur. (E.g. common house fly.)

2. Biological transmission: This is when the agent multiplies in the arthropod before it is transmitted, such as the transmission of malaria by mosquito.

C. <u>Air-borne transmission</u>: Dissemination of microbial agent by air to a suitable portal of entry, usually the respiratory tract. Two types of particles are implicated in this kind of spread: dusts and droplet nuclei.

Dust: small infectious particles of widely varying size that may arise from soil, clothes, bedding or contaminated floors and be suspended by air currents.

Droplet nuclei: Small residues resulting from evaporation of fluid (droplets emitted by an infected host). They usually remain suspended in the air for long periods of time.

E. <u>Portal of entry</u>: The site in which the infectious agent enters to the susceptible host. For example:

- Mucus membrane
- Skin
- Respiratory tract
- GIT
- Blood

F. Susceptible host (host factors): A person or animal lacking sufficient resistance to a particular pathogenic agent to prevent disease if or when exposed. Occurrence of infection and its outcome are in part determined by host factors. The term “immunity” is used to describe the ability of the host to resist infection.

Resistance to infection is determined by non-specific and specific factors: Non-specific factors ƒ Skin and mucus membrane Mucus, tears, gastric secretion Reflex responses such as coughing and sneezing. Specific factors Genetic-hemoglobin resistant to Plasmodium falciparum naturally acquired or artificially induced immunity.

Acquired immunity may be active or passive.

Active immunity- acquired following actual infection or immunization.

Passive immunity- pre-formed antibodies given to the host.

Carrier and Its Type

A carrier is an infected person or animal who does not have apparent clinical disease but is a potential source of infection to others.

a. Healthy or asymptomatic carriers: These are persons whose infection remains unapparent. For example, in poliovirus, meningococcal and hepatitis virus infections, there is a high carrier rate.

b. Incubatory or precocious carriers: These are individuals or persons who excrete the pathogen during the incubation period (i.e. before the onset of symptoms or before the characteristic features of the disease are manifested). E.g. Measles, mumps, chickenpox and hepatitis.

c. Convalescent Carriers: These are those who continue to harbor the infective agent after recovering from the illness. E.g. Diphtheria, Hepatitis B virus.

d. Chronic Carriers: The carrier state persists for a long period of time. E.g. Typhoid fever, Hepatitis B virus infection

Time Course of Infectious Diseases

Incubation period: It is the interval of time between infection of the host and the first appearance of symptoms and signs of the disease

Prodromal period: It is the interval between the onset of symptoms of an infectious disease and the appearance of characteristic manifestations. For example, in a measles patient, fever and coryza occur in the first three days and Koplick spots in the buccal mucosa and characteristics skin lesions appear on the fourth day.

Period of communicability: The period during which that particular communicable disease (infectious agent) is transmitted from the infected person to the susceptible host.

SELF-CHECK -2	WRITTEN TEST

Choose the best answer

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

1. The occurrence of any health related condition in a given population in excess of the usual frequency in that population is(1)

A. Endemic C. Sporadic

B. Epidemics D. Pandemic

2. Presence of living infectious agent on the exterior surface of the body(1)

A. Carrier C. Vector

B. Infectious D. Infestation

3. State of physiological or psychological dysfunction

A/ Disease B/Health C/ Wellbeing D/ All

4. The objectives primary prevention are

A/ To promote health, B/ Prevent exposure C/ Prevent disease D/ All

5 .The study of the frequency, distribution and determinants of disease and other health related conditions in human populations

A/ Epidemiology B/ Cytology C/ Histology D/ None

6. Chronic Carriers: The carrier state persists for a long period of time

A/ Chronic Carriers B/Convalescent Carriers C/ precocious carriers D/ All

7. These are those who continue to harbor the infective agent after recovering from the illness.

A/ Convalescent Carriers B/ Chronic Carriers C/ Incubatory Carriers D/ None

8.These are individuals or persons who excrete the pathogen during the incubation period

A/ Incubatory Carriers B/ Convalescent Carriers C/precocious carriersD/ A & C

9. Presence of living infectious agent upon articles

A/ Decontamination B/ Contamination C/Infectious D/ None

10. Presence of living infectious agent on the exterior surface of the body

A/ Infestation B/ / Infectious C/ Agent D/ All

11. Caused by microbes and can be transmitted to other persons.

A/ / Infectious B/ Inflammation C/ Causative agent D/ None

12. An agent capable of causing infection

A/. Infectious agent B/ Causative agent C/ MOs D/ All

ANSWER SHEET

Name: _____ Date: _____

Choices

1._____ 2. _____ 3._____ 4. _____ 5. _____ 6. _____ 7. ____ 8. _____ 9. _____ 10. _____11.----------12

References

1. Produced in collaboration with the Ethiopia Public Health Training Initiative, The Carter Center, the Ethiopia Ministry of Health, and the Ethiopia Ministry of Education.

Oral-fecal transmitted diseases

Introduction:-What the diseases in this group have in common is that the causative organisms are excreted in the stools of infected persons (or, rarely, animals). The portal of entry for these diseases is the mouth

- Therefore, the causative organisms have to pass through the environment from the feces of an infected person to the gastro-intestinal tract of a susceptible person. This is known as the fece-oral transmission route. Oral-oral transmission occurs mostly through unapparent fecal contamination of food, water and hands.
- As indicated in the schematic diagram below, food takes a central position; it can be directly or indirectly contaminated via polluted water, dirty hands, contaminated soil, or flies
- The five “F” s which play an important role in fecal oral diseases transmission (finger, flies, food, fomites and fluid).

1. Feces Mainly in Water

The diseases in this group are mainly transmitted through fecal contaminated water rather than food.

1.1 Typhoid fever

Definition; - A systemic infectious disease characterized by high continuous fever, malaise and involvement of lymphoid tissues.

Infectious agent; -Salmonella tophi Salmonella enteritis’s (rare cause)

Epidemiology Occurrence- It occurs worldwide, particularly in poor socio- economic areas. Annual incidence is estimated at about 17 million cases with approximately 600,000 deaths worldwide. In endemic areas the disease is most common in preschool and school aged children (5-19 years of age).

Reservoir- Humans

Mode of transmission- By water and food contaminated by feces and urine of patients and carriers. Flies may infect foods in which the organisms then multiply to achieve an infective dose.

Incubation period –1-3 weeks

Period of communicability- As long as the bacilli appear in excreta, usually from the first week throughout convalescence. About 10% of untreated patients will discharge bacilli for 3 months after onset of symptoms, and 2%-5% become chronic carriers.

Susceptibility and resistance- Susceptibility is general and increased in individuals with gastric achlorhydria or those who are HIV positive. Relative specific immunity follows recovery from clinical disease, unapparent infection and active immunization but inadequate to protect against subsequent ingestion of large numbers of organisms.

Clinical manifestation

- **First week**- Mild illness characterized by fever rising stepwise (ladder type), anorexia, lethargy, malaise and general aches. Dull and continuous frontal headache is prominent. Nose bleeding, vague abdominal pain and constipation in 10% of patients.
- **Second week**- Sustained temperature (fever). Severe illness with weakness, mental dullness or delirium, abdominal discomfort and distension. Diarrhea is more common than first week and feces may contain blood.
- **Third week**- Patient continues to be febrile and increasingly exhausted. If no complications occur, patient begins to improve and temperature decreases gradually.

Clinical manifestations suggestive of typhoid fever

Fever- Sustained fever (ladder fashion)

Rose spots- Small pallor, blanching, slightly raised macules usually seen on chest and abdomen in the first week in 25% of white people.

Relative bradycardia- Slower than would be expected from the level of temperature. *ƒ*

Leucopoenia- White cell count is less than 4000/mm3 of blood.

Diagnosis

- Based on clinical grounds but this is confused with wide variety of diseases.
- Widal reaction against somatic and flagella antigens.
- Blood, feces or urine culture.

Treatment

1. Ampicillin or co-trimoxazole for carriers and mild cases.
2. Chloramphenicol or ciprofloxacin or ceftriaxone for seriously ill patients.

Nursing care

1. Maintain body temperature to normal.
2. Apply comfort measures.
3. Follow side effects of drugs.
4. Monitor vital signs.
5. Follow strictly enteric precautions:
    - ✓ Wash hands
    - ✓ Wear gloves
    - ✓ Teach all persons about personal hygiene
6. Observe the patient closely for sign and symptoms of
    - ✓ Bowel perforation
    - ✓ Erosion of intestinal ulcers
    - ✓ Sudden pain in the lower right side of the abdomen
    - ✓ Abdominal rigidity
    - ✓ Sudden fall of temperature and blood pressure
7. Accurately record intake and output.
8. Provide proper skin and mouth care.

Prevention and control

1. Treatment of patients and carriers
2. Education on hand washing, particularly food handlers, patients and childcare givers
3. Sanitary disposal of feces and control of flies.
4. Provision of safe and adequate water
5. Safe handling of food

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1.2 Bacillary Dysentery (Shigellosis)

Definition;- An acute bacterial disease involving the large and distal small intestine, caused by the bacteria of the genus shigella.

Infectious agent

Shigella is comprised of four species or serotypes.

Group A= Shigella dysenteries (most common cause)

Group B= Shigella flexneri

Group C= Shigella boydii

Group D= Shigella sonnei

Epidemiology

Occurrence- It occurs worldwide, and is endemic in both tropical and temperate climates. Outbreaks commonly occur under conditions of crowding and where personal hygiene is poor, such as in jails, institutions for children, day care centers, mental hospitals and refugee camps. It is estimated that the disease causes 600,000 deaths per year in the world. Two-thirds of the cases, and most of the deaths, are in children under 10 years of age.

Reservoir- Humans

Mode of transmission-Mainly by direct or indirect fecal-oral transmission from a patient or carrier. Transmission through water and milk may occur as a result of direct fecal contamination. Flies can transfer organisms from latrines to a non-refrigerated food item in which organisms can survive and multiply.

Incubation period- 12 hours-4 days (usually 1-3 days)

Period of communicability- During acute infection and until the infectious agent is no longer present in feces, usually within four weeks after illness.

Susceptibility and resistance- Susceptibility is general. The disease is more severe in young children, the elderly and the malnourished. Breast-feeding is protective for infants and young children

Clinical Manifestation

- ✓ Fever, rapid pulse, vomiting and abdominal cramp are prominent.
- ✓ Diarrhea usually appears after 48 hours with dysentery supervening two days later.
- ✓ Generalized abdominal tenderness.
- ✓ Tenesmus is present and feces are bloody, mucoid and of small quantity.
- ✓ Dehydration is common and dangerous - it may cause muscular cramp, oliguria and shock.

Diagnosis

- ✓ Based on clinical grounds
- ✓ Stool microscopy (presence of pus cells)
- ✓ Stool culture confirms the diagnosis

Treatment

1. Fluid and electrolyte replacement
2. Co-trimoxazole in severe cases or Nalidixic acid in the case of resistance.

Prevention and control

1. Detection of carriers and treatment of the sick will interrupt an epidemic.
2. Hand washing after toilet and before handling or eating food
3. Proper excreta disposal especially from patients, convalescent and carriers.
4. Adequate and safe water supply.
5. Control of flies.
6. Cleanliness in food handling and preparation.

1.3 Amoebiasis (Amoebic Dysentery)

Definition ;- An infection due to a protozoan parasite that causes intestinal or extra-intestinal disease. Infectious agent Entamoeba histolytic

Epidemiology

Occurrence-worldwide but most common in the tropics and sub-tropics. Prevalent in areas with poor sanitation, in mental institutions and homosexuals. Invasive Amoebiasis is mostly a disease of young people (adults). Rare below 5 years of age, especially below 2 years.

Mode of transmission – Fecal-oral transmission by ingestion of food or water contaminated by feces containing the cyst. Acute amoebic dysentery poses limited danger.

Incubation period- Variable from few days to several months or years; commonly 2-4 weeks.

Period of communicability- During the period of passing cysts of E. histolytica, which may continue for years.

Susceptibility and resistance- Susceptibility is general. Susceptibility to reinfection has been demonstrated but is apparently rare.

Clinical Manifestation

- ✓ Starts with a prodromal episode of diarrhea, abdominal cramps, nausea, vomiting and Tenesmus.
- ✓ With dysentery, feces are generally watery, containing mucus and blood.

Diagnosis

Demonstration ofEntamoeba histolytica cyst or trophozoite in stool.

Treatment

1. Metronidazole or Tinidazole

Prevention and control

1. Adequate treatment of cases
2. Provision of safe drinking water
3. Proper disposal of human excreta (feces) and hand washing following defecation.

1.4. Giardiasis

Definition;- A protozoan infection principally of the upper small intestine associated with symptoms of chronic diarrhea, steatorrheaabdominal cramps, bloating, frequent loose and pale greasy stools, fatigue and weight loss.

Infectious agent'- Giardia lamblia

Epidemiology

Occurrence- Worldwide distribution. Children are more affected than adults. The disease is highly prevalent in areas of poor sanitation.

Reservoir- Humans Mode of transmission- Person to person transmission occurs by hand to mouth transfer of cysts from feces of an infected individual especially in institutions and day care centers.

Period of communicability-Entire period of infection, often months.

Susceptibility and resistance- Asymptomatic carrier rate is high. Infection is frequently self-limited. Persons with AIDS may have more serious and prolonged infection.

Life cycle

TRANSMISSION

1. Cysts ingested in food, water or from hands contaminated with feces

HUMAN HOST

2. Cysts excyst, forming trophozoite
3. Multiply in intestine
4. Trophozoite encysts.
5. Infective cysts passed in feces. * * trophozoite passed in feces disintegrate.

ENVIRONMENT

6. Feces containing infective cysts contaminate the environment.

Clinical Manifestation

- ✓ Ranges fromasymptomatic infection to severe failure to thrive and mal-absorption.
- ✓ Young children usually have diarrhea but abdominal distension and bloating are frequent

- ✓ Adults have abdominal cramps, diarrhea, anorexia, nausea, malaise, bloating, many patients complain of sulphur testing (belching).

Diagnosis

- ✓ Demonstration of Giardia lamblia cyst or trophozoite in feces.

Treatment

1. Metronidazole or Tinidazole

Prevention and control

1. Good personal hygiene, and hand washing before food and following toilet use
2. Sanitary disposal of feces
3. Protection of public water supply from contamination of feces
4. Case treatment
5. Safe water supply

1.5. Cholera

Definition; - An acute illness caused by an enterotoxin elaborated by vibrio cholerae.

Infectious agent; - Vibrio cholera

Epidemiology

Occurrence- has made periodic outbreaks in different parts of the world and given rise to pandemics. Endemic predominantly inchildren.

Reservoir- Humans

Mode of transmission- by ingestion of food or water directly or indirectly contaminated with feces or vomitus of infected person.

Incubation period- from a few hours to 5 days, usually 2-3 days.

Period of communicability- for the duration of the stool positive stage, usually only a few days after recovery. Antibiotics shorten the period of communicability

Susceptibility and resistance- Variable. Gastric achlorhydria increases risk of illness. Breast-fed infants are protected

Clinical Manifestation ƒ

- ✓ Abrupt painless watery diarrhea; the diarrhea looks like rice water.
- ✓ In severe cases, several liters of liquid may be lost in few hours leading to shock.
- ✓ Severely ill patients are cyanotic, have sunken eyes and cheeks, scaphoid abdomen, poor skin turgor, and thread or absent pulse.
- ✓ Loss of fluid continues for 1-7 days.

Diagnosis

- ✓ Based on clinical grounds
- ✓ Culture (stool) confirmation

Treatment

1. Prompt replacement of fluids and electrolytes
   - ✓ Rapid IV infusions of large amounts
   - ✓ Isotonic saline solutions alternating with isotonic sodium bicarbonate or sodium lactate.

2. Antibiotics like tetracycline dramatically reduce the duration and volume of diarrhea resulting in early eradication of vibrio cholera.

Nursing care

1. Wear gown and glove.
2. Wash your hands.
3. Monitor output including stool output.
4. Protect the patient family by administering Tetracycline.
5. Health education.

Prevention and control

1. Case treatment
2. Safe disposal of human excreta and control of flies
3. Safe public water supply
4. Hand washing and sanitary handling of food
5. Control and management of contact cases

1.6. Infectious hepatitis

(Viral hepatitis A, Epidemic hepatitis, type A hepatitis)

Definition;- An acute viral disease characterized by abrupt onset of fever, malaise, anorexia, nausea and abdominal discomfort followed within a few days by jaundice.

Infectious agent;- Hepatitis A virus

Epidemiology

Occurrence- Worldwide distribution in sporadic and epidemic forms. In developing countries, adults are usually immune andepidemics of HA are uncommon. Infection is common where environmental sanitation is poor and occurs at an early age.

Reservoir- Humans.

Mode of transmission-

- ✓ Personto person by fecal-oral route.
- ✓ Through contaminated water and food contaminated by infected food handlers.

Incubation period- 15-55 days, average 28-30 days.

Period of communicability- High during the later half of the incubation period and continuing for few days following onset of jaundice. Most cases are non-infectious following first week of jaundice.

Susceptibility and resistance- Susceptibility is general. Immunity following infection probably lasts for life.

Clinical manifestation

- ✓ Abrupt onset of fever, malaise, anorexia, nausea and abdominal discomfort, followed in few days by jaundice.
- ✓ Complete recovery without sequel or recurrence as a rule.

Diagnosis ;-

- ✓ Based on clinical and epidemiological grounds
- ✓ Demonstration of IgM (IgM anti-HAV) in the serum of acutely or recently ill patients.

Treatment

Symptomatic: Rest, high carbohydrate diet with low fat and protein.

Prevention and control

1. Public education about good sanitation and personal hygiene, with special emphasis on careful hand washing and sanitary disposal of feces.
2. Proper water treatment and distribution systems and sewage disposal.
3. Proper management of day care centers to minimize possibility of fecal-oral transmission.
4. HA vaccine for all travelers to intermediate or highly endemic areas.
5. Protection of day care centers' employees by vaccine

2. Feces Mainly in Soil

The diseases in this category are mainly transmitted through fecal contamination of soil. These infections are acquired through man's exposure to fecally contaminated soil.

Ascariasis

Definition;- A helminthic infection of the small intestine generally associated with few or no symptoms.

Infectious agent ;-Ascaris lumbricoides.

Epidemiology

Occurrence- The most common parasite of humans where sanitation is poor. School children (5-10 years of age) are most affected. Highly prevalent in moist tropical countries

Reservoir-Humans; ascarid eggs in soil.

Mode of transmission- Ingestion of infective eggs from soil contaminated with human feces or uncooked produce contaminated with soil containing infective eggs but not directly from person to person or from fresh feces.

Incubation period- 4-8 weeks.

Period of communicability- As long as mature fertilized female worms live in the intestine. Usual life span of the adult worm is 12 months

Susceptibility and resistance- Susceptibility is general

Life Cycle

1. Infective eggs ingested in food or from contaminated hands
2. Larvae hatchMigrate through liver and lungs.
3. Pass up trachea and are swallowed
4. Become mature worms in small intestine
5. Eggs produced and passed in feces.
6. Eggs become infective (embrocated) in soil in 30-40 days.
7. Infective eggs contaminate the environment.

Clinical Manifestation

- ✓ Most infections go unnoticed until large worm is passed in feces and occasionally the mouth and nose.
- ✓ Migrant larvae may cause itching, wheezing and dyspnea, fever, cough productive of bloody sputum may occur
- ✓ Abdominal pain may arise from intestinal or duct (biliary, pancreatic) obstruction.
- ✓ Serious complications include bowel obstruction due to knotted/intertwined worms.

Diagnosis;-

- ✓ Microscopic identification of eggs in a stool sample *ƒ*
- ✓ Adult worms passed from anus, mouth or nose.

Treatment

1. Albendazole or
2. Mebendazole or
3. Piperazine or
4. Levamisole

Prevention and control

1. Treatment of cases
2. Sanitary disposal of feces
3. Prevent soil contamination in areas where children play
4. Promote good personal hygiene (hand washing).

Trichuriasis

Definition;- A nematode infection of the large intestine, usually asymptomatic in nature

Infectious agent ;- Trichuriasis trichuria (whip worm)

Epidemiology

Occurrence- Worldwide, especially in warm moist regions.

Common in children 3-11 years of age.

Reservoir- Humans

Mode of transmission- Indirect, particularly through pica or ingestion of contaminated vegetables. Not immediately transmissible from person to person.

Incubation period- Indefinite

Period of communicability- Several years in untreated carriers.

Susceptibility and resistance- Susceptibility is universal

Life Cycle

1. Infective eggs ingested in food or from contaminated hand
2. Larvae hatch. Develop in small intestine. Migrate to caecum.
3. Become mature worms.
4. Eggs produced and passed in feces.
6. Eggs become infective (embryonated) in soil after 3 weeks.
7. Infective eggs contaminate the environment

Clinical manifestation

- ✓ Severity is directly related to the number of infecting worms.
- ✓ Most infected people are asymptomatic.
- ✓ Abdominal pain, tiredness, nausea and vomiting, diarrhea or constipation are complaints by patients.
- ✓ Rectal prolapse may occur in heavily infected very young children

Diagnosis

- ✓ Demonstration of eggs in feces.

Treatment

1. Albendazole or 2. Mebendazole

Prevention and control

1. Sanitary disposal of feces
2. Maintaining good personal hygiene (i.e. washing hands and vegetables and other soil contaminated foods)
3. Cutting nails especially in children
4. Treatment of cases

Entrobiasis

(Oxyuriasis, pinworm infection)

Definition;- A common intestinal helminthic infection that is often asymptomatic.

Infectious agent;- Entrobius vermicularis

Epidemiology

Occurrence- Worldwide, affecting all socio-economic classes with high rates in some areas. Prevalence is highest in school-aged children, followed by preschools and is lowest in adults except for mothers of infected children. Prevalence is often high in domiciliary institutions. Infection usually occurs in more than one family member.

Reservoir- Human

Mode of transmission- Direct transfer of infective eggs by hand from anus to mouth of the same or another person or indirectly through clothing, bedding, food or other articles contaminated with eggs of the parasite.

Incubation period- 2-6 weeks

Period of communicability- As long as gravid females are discharging eggs on perianal skin. Eggs remain infective in an indoor environment for about 2 weeks.

Susceptibility and resistance- Susceptibility is universal.

Clinical manifestation

- ✓ Perianal itching disturbed sleep, irritability and sometimes secondary infection of the scratched skin.

Diagnosis

- ✓ Stool microscopy for eggs or female worms.

Treatment

1. Mebendazole.

Prevention and control

1. Educate the public about hygiene (i.e. hand washing before eating or preparing food, keeping nails short and discourage nail biting).
2. Treatment of cases
3. Reduce overcrowding in living accommodations.
4. Provide adequate toilets

Strongyloidiasis

Definition ;- An often asymptomatic helminthic infection of the duodenum and upper jejunum.

Infectious agent;- Strongyloidiasis stercolaris

Epidemiology

Occurrence- In tropical and temperate areas. More common in warm and wet regions.

Reservoir- Human

Mode of transmission-Infective (filariform) larvae penetrate the skin and enter the venous circulation.

Incubation period- 2-4 weeks (from skin penetration up to when rabidity form larvae appear in the feces).

Period of communicability- As long as living worms remain in the intestine; up to 35 years in cases of auto-infection.

Susceptibility and resistance- Susceptibility is universal. Patients with AIDS or on immuno-suppressive medication are at risk of dissemination

Life Cycle

1. Infective filariform larvae penetrate skin, e.g. feet. Autoinfection also occurs
2. Larvae migrate, pass up trachea and are swallowed.
3. Become mature worms in small intestine
4. Eggs laid. Hatch Rhabditiform larvae in intestine.
5. Rhabditiform larvae:

- Passed in feces, or

- Become filariform larvae in intestine, causing autoinfection

6. In soil larvae become free living worms produce more Rhabditiform larvae* * Free-living cycle can be repeated several times

7. Become infective filariform larvae in the soil

Clinical Manifestation

- ✓ Pneumonia occurs during heavy larval migration.
- ✓ Mild peptic ulcer like epigastric discomfort to severe watery diarrhea.
- ✓ Heavy infection may result in malabsorption syndrome.

Diagnosis

- ✓ Identification of larvae in stool specimen

Treatment

1. Albendazole or

2. Thiabendazole

Prevention and control

1. Proper disposal of human excreta (feces)

2. Personal hygiene including use of footwear.

3. Case treatment.

Hookworm disease

(Ancylostomiasis, Necatoriasis)

Definition ;- A common chronic parasitic infection with a variety of symptoms usually in proportion of the degree of anemia

Infectious agent;- Ancylostoma duodenal and Necator americanus

Epidemiology

Occurrence- Widely endemic in tropical and subtropical countries where sanitary disposal of human feces is not practiced and the soil moisture and temperature conditions favor development of infective larvae.

Reservoir- Humans

Mode of transmission-Through skin penetration by the infective larvae.

Incubation period- Symptoms may develop after a few weeks to many months depending on intensity of infection and iron intake of the host.

Period of communicability- Infected people can contaminate the soil for several years in the absence of treatment.

Susceptibility and resistance- Susceptibility is universal. No evidence that immunity develops with infection

Life cycle

1. Infective filariform larvae penetrate the skin, e.g. feet. A. duodenal also transmitted by ingestion of larvae
2. Larvae migrate. Pass up trachea and are swallowed.
3. Become mature worms in small intestine (attach to wall and suck blood).
4 Eggs produced and passed in feces
5. Eggs develop; Rhabditiform larvae hatch. Feed in soil.
6. Develop into infective filariform larvae in about 1 week.
7. Filariform larvae contaminate soil

Clinical Manifestation

The clinical manifestation is related to:

1. Larval migration of the skin
   - ✓ Produces transient, localized maculopapular rash associated with itching called ground itch.
2. Migration of larva to the lungs.
   - ✓ Produces cough, wheezing and transient pneumonitis.
3. Blood sucking
   - ✓ Light infection-no symptoms
   - ✓ Heavy infection-result in symptoms of peptic ulcer disease like epigastric pain and tenderness. Further loss of blood leads to anemia manifested by exertional dyspnea, weakness and light-headedness.

Diagnosis; -Demonstration of eggs in stool specimen.

Treatment

1. Mebendazole or
2. Albendazole or
3. Levamisole

Prevention and control

1. Sanitary disposal of feces
2. Wearing of shoes
3. Case treatment.

3. Direct Contact with Feces

These are diseases transmitted mainly through direct contact with feces of the infected person

Poliomyelitis

Definition;- A viral infection most often recognized by the acute onset of flaccid paralysis.

Infectious agent; - Polio viruses (type I, II and III)

Epidemiology

Occurrence – Worldwide prior to the advent of immunization. Cases of polio occur both sporadically and in epidemics. Primarily a disease of infants and young children. 70-80% of cases are less than three years of age. More than 90% of infections are unapparent. Flaccid paralysis occurs in less than 1% of infections

Reservoir – humans, especially children

Mode of transmission- Primarily person-to-person, spread principally through the fecal-oral route. In rare instances, milk,food stuffs and other materials contaminated with feces have been incriminated as vehicles.

Incubation period- commonly 7-14 days

Period of communicability – not precisely known, but transmission is possible as long as the virus is excreted.

Susceptibility and resistance- Susceptibility is common in children but paralysis rarely occurs. Infection confers permanent immunity.

Clinical manifestation

- ✓ Usually asymptomatic or non-specific fever is manifested in 90% of cases.
- ✓ If it progresses to major illness, severe muscle pain, stiff neck and back with or without flaccid paralysis may occur.
- ✓ Paralysis is asymptomatic and occurs within three to four days of illness.
- ✓ The legs are more affected than other part of the body.
- ✓ Paralysis of respiratory and swallowing muscles is life- threatening.

Diagnosis

Based on clinical and epidemiological ground

Treatment Symptomatic

Prevention and control

1. Educate public about the advantage of immunization in early childhood.
2. Trivalent live attenuated vaccine (OPV) at birth.
3. Safe disposal of human excreta (feces).

Hydrated Disease (Echinococcosis)

Definition The tapeworm Echinococcus granulosus is the most common species of Echinococcus and causes cystic hydrated disease.

Infectious agent;- Echinococcus granulosus, a small tapeworm of dog

Epidemiology

Occurrence – occurs on all continents except Antarctica. Especially common in grazing countries where dogs consume viscera containing cysts.

Reservoir- Domestic dogs and other canids are definitive hosts; they may harbor thousands of adult tapeworms in theirintestines without signs of infection. Sheep act as intermediate hosts.

Mode of transmission– directly with hand to mouth transfer of eggs after association with infected dogs or indirectly through contaminated food, water, soil or fomites.

Incubation period – variable from 12 months to many years, depending on the number and location of cysts and how rapidly they grow.

Period of communicability – Infected dogs begin to pass eggs approximately 7weeks after infection. Most canine infections resolve spontaneously by six months.

Susceptibility and resistance – Children are more likely to be exposed to infection because they are more likely to have close contact with infected dogs.

Clinical manifestations; -

- The signs and symptoms vary according to location of the cyst and number.
- Ruptured or leaking cysts can cause severe anaphylactic reactions.
- Cysts are typically spherical, thick walled and unilocular and are most frequently found in the liver and lungs.

Diagnosis

- History of residence in an endemic area along with association with canines'
- Solography and CT scan
- Serologic test

Treatment

1. Surgical resection of isolated cysts is the most common treatment.
2. Albendazole (Mebendazole)
3. If cysts rupture, praziquantel

Prevention and control

1. Educate the public at risk to avoid exposure to dog feces.
   - Hand washing should be emphasized.
2. Interrupt transmission from intermediate to definitive hosts
   - By preventing dogs' access to uncooked viscera.
3. Safe disposal of infected viscera.
4. Periodical treatment of high-risk dogs.

3. Air-borne diseases

Introduction

The organisms causing the diseases in the air-borne group enter the body via the respiratory tract. When a patient or carrier of pathogens talks, coughs, laughs, or sneezes, he/she discharges fluid droplets. The smallest of these remain up in the air for some time and may be inhaled by a new host. Droplets with a size of 1-5 microns are quite easily drawn in to the lungs and retained thereDroplets that are bigger in size will not remain air-borne for long but will fall to the ground.

Here, however, they dry and mix with dust. When they contain pathogens that are able to survive drying, these may become air-borne again by wind or something stirring up the dust, and they can then be inhaled. Air-borne diseases, obviously, will spread more easily when there is overcrowding, as in overcrowded class rooms, public transport, canteens, dance halls, and cinemas. Good ventilation can do much to counteract the effects of overcrowding. Air-borne diseases are mostly acquired through the respiratory tract.

Common Cold (Acute Viral Rhinitis or Coryza)

Definition

An acutecatarrhal infection of the upper respiratory tract.

Infectious agent Rhino viruses (100 serotypes) are the major causes in adults. Parainfluenza viruses, respiratory syncytial viruses (RSV), Influenza, and Adeno viruses cause common cold-like illnesses in infants and children

Epidemiology Occurrence- Worldwide both in endemic and epidemic forms. Many people have one to six colds per year. Greater incidence in the highlands. Incidence is high in children under 5 years and gradually declines with increasing age.

Reservoir- Humans

Mode of transmission- by direct contact or inhalation of airborne droplets. Indirectly by hands and articles freshly soiled by discharges of nose and throat of an infected person.

Incubation period-between 12 hours and 5 days, usually 48 hours, varying with the agent.

Period of communicability- 24 hours before onset and for 5 days after onset.

Susceptibility and resistance- Susceptibility is universal. Repeated infections (attacks) are most likely due to multiplicity of agents.

Clinical Manifestation

- Coryza, sneezing, lacrimation, pharyngeal or nasal irritation, chills and malaise
- Dry or painful throat.

Diagnosis*f*;- Based on clinical grounds

Treatment

1. No effective treatment but supportive measures like:
    - Bed rest
    - Steam inhalation
    - High fluid intake
    - Anti-pain
    - Balanced diet intake

Prevention and Control

1. Educate the public about the importance of: *f*
    - Hand washing *f*
    - Covering the mouth when coughing and sneezing *f*
    - Sanitary disposal of nasal and oral discharges
2. Avoid crowding in living and sleeping quarters especially in institutions

3.Providadequateventilation

Measles (Rubella)

Definition

An acute highly communicable viral disease

Infectious agent; -Measles virus

Epidemiology Occurrence- Prior to widespread immunization, measles was common in childhood so that more than 90% of people had been infected by age 20; few went through life without any attack.

Reservoir- Humans

Mode of transmission- Airborne by droplet spread, direct contact with nasal or throat secretions of infected persons and less commonly by articles freshly solid with nose and throat secretion. Greater than 94% herd immunity may be needed to interrupt community transmission.

Incubation period-7-18 days from exposure to onset of fever.

Period of communicability- slightly before the prodromal period to four days after the appearance of the rash and minimal after the second day of rash.

Susceptibility and resistance- All those who are non-vaccinated or have not had the disease are susceptible. Permanent immunity is acquired after natural infection or immunization.

Clinical Manifestation

- Prodromal fever, conjunctivitis, coryza, cough and Koplik spots on the buccal mucosa
- A characteristic red blotchy rash appears on the third to seventh day, beginning on the face, gradually becoming generalized, lasting 4-7 days.
- Leucopoenia is common.
- Complications like otitis media, pneumonia, diarrhea, encephalitis, croup (Laryngo trachea bronchitis) may result from viral replication or bacterial super infection.

Diagnosis

- Based on clinical and epidemiological grounds

Treatment

1. No specific treatment
2. Treatment of complications
3. Vitamin A provision

Nursing care

1. Advise patient to have bed rest.
2. Relief of fever.
3. Provision of non-irritant small frequent diet.
4. Shorten the fingernails.

Prevention and control

1. Educate the public about measles immunization.
2. Immunization of all children (less than 5 years of age) who had contact with infected children.
3. Provision of measles vaccine at nine months of age.
4. Initiate measles vaccination at 6 months of age during epidemic and repeat at 9 months of age.

Influenza

Definition ;- An acute viral disease of the respiratory tract

Infectious agent;- Three types of influenza virus (A,B and C)

Epidemiology Occurrence- In pandemics, epidemics and localized outbreaks.

Reservoir-Humans are the primary reservoirs for human infection.

Mode of transmission- Airborne spread predominates among crowded populations in closed places such as school buses.

Incubation period- short, usually 1-3 days

Period of communicability-3-5 days from clinical onset in adults; up to 7 days in young children.

Susceptibility and resistance- when a new sub-type appears, all children and adults are equally susceptible. Infection produces immunity to the specific infecting agent.

Clinical Manifestation ;- Fever, head ache, myalgia, prostration, sore throat and cough Cough is often severe and protracted, but other manifestations are self-limited with recovery in 2-7days

Diagnosis; - Based on clinical ground

Treatment

1. Same as common cold, namely:

- Anti-pain and antipyretic
- High fluid intake
- Bed rest
- Balanced diet intake

Prevention and control

1. Educate the public in basic personal hygiene, especially the danger of unprotected coughs and sneezes and hand to mucus membrane transmission.
2. Immunization with available killed virus vaccines may provide 70-80% protection.
3. Amantadine hydrochloride is effective in the chemoprophylaxis of type A virus but not others

Diphtheria

Definition;- An acute bacterial disease involving primarily tonsils, pharynx, nose, occasionally other mucus membranes or skin and sometimes the conjunctiva or genitalia.

Infectious agent;- Corynebacterium diphtheria

Epidemiology Occurrence-Disease of colder months in temperate zones, involving primarily non-immunized children less than 15 years of age. It is often found among adult population groups whose immunization was neglected. Unapparent, cutaneous and wound diphtheria cases are much more common in the tropics.

Reservoir- Humans

Mode of transmission-contact with a patient of carrier. i.e. with oral or nasal secretions or infected skin.

Incubation period- usually 2-5 days

Period of communicability- variable, until virulent bacilli have disappeared from discharges and lesion; usually 2 weeks or less.

Susceptibility and resistance- Susceptibility is universal. Infants borne to immune mothers are relatively immune, but protection is passive and usually lost before 6 months. Recovery from clinical disease is not always followed by lasting immunity. Immunity is often acquired through unapparent infection. Prolonged active immunity can be induced by diphtheria toxoid.

Clinical Manifestation

- Characteristic lesion marked by a patch or patches of an adherent grayish membrane with a surrounding inflammation (pseudo membrane).
- Throat is moderately sore in pharyngo tonsillar diphtheria, with cervical lymph nodes somewhat enlarged and tender; in severe cases, there is marked swelling and edema of neck.
- Late effects of absorption of toxin appearing after 2-6 weeks, including cranial and peripheral, motor and sensory nerve palsies and myocarditis (which may occur early) and are often severe

Diagnosis

- Based on clinical and epidemiological grounds
- Bacteriologic examination of discharges from lesions.

Treatment

1. Diphtheria antitoxin
2. Erythromycin for 2 weeks but 1 week for cutaneous form or
3. Procaine penicillin for 14 days or single dose of Benzathin penicillin

Primary goal of antibiotic therapy for patients or carriers is to eradicate C. diphtherias and prevent transmission from the patient to susceptible contacts.

Prevention and control

1. Educate the public, and particularly the parents of young children, of the hazards of diphtheria and the necessity for active immunization.
2. Immunization of infants with diphtheria toxoid.
3. Concurrent and terminal disinfection of articles in contact with patient and soiled by discharges of patient.

4. Single dose of penicillin (IM) or 7-10 days course of Erythromycin (PO) is recommended for all persons exposed to diphtheria.

Pertussis (whooping cough)

Definition ;- An acute bacterial disease involving the respiratory tract.

Infectious agent;- Bordetella pertussis

Epidemiology Occurrence- An endemic disease common to children especially young children everywhere in the world. A marked decline has occurred in incidence and mortality rates during the past four decades. Outbreaks occur periodically. Endemic in developing world and 90% of attacks occur in children under 6 years of age.

Reservoir- Humans

Mode of transmission- Primarily by direct contact with discharges from respiratory mucus membranes of infected persons by airborne route, probably by droplets. Indirectly by handling objects freshly solid with nasopharyngeal secretions.

Incubation period- 1-3 weeks

Period of communicability- Highly communicable in early catarrhal stage before the paroxysmal cough stage. The most contagious disease with an attack rate of 75-90%. Gradually decreases and becomes negligible in about 3 weeks. When treated with erythromycin, infectiousness is usually 5 days or less after onset of therapy.

Susceptibility and resistance- Susceptibility to non-immunized individuals is universal. One attack usually confers prolonged immunity but may not be lifelong.

Clinical manifestation

The disease has insidious onset and 3 phases:

1. **Catarrhal phase**
   - Lasts 1-2 weeks
   - Cough and rhinorrhea
2. **Paroxysmal phase**
   - Explosive, repetitive and prolonged cough
   - Child usually vomits at the end of paroxysm
   - Expulsion of clear tenacious mucus often followed by vomiting

- Whoop (inspiratory whoop against closed glottis) between paroxysms.
- Child looks healthy between paroxysms
- Paroxysm of cough interferes with nutrition and cough
- Cyanosis and sub conjunctiva hemorrhage due to violent cough.

3. **Convalescent phase**

- The cough may diminish slowly or may last long time.
- After improvement the disease may recur.

Diagnosis

- Difficult to distinguish it from other URTI
- History and physical examination at phase two (paroxysmal phase) ensure the diagnosis.
- Marked lymphocytosis.

Treatment

1. Erythromycin- to treat the infection in phase one but to decrease transmission in phase two

2. Antibiotics for super infections like pneumonia because of bacterial invasion due to damage to cilia.

Nursing care

1. Proper feeding of the child.

2. Encourage breastfeeding immediately after an attack (each paroxysm).

3. Proper ventilation- continuous well humidified oxygen administration.

4. Reassurance of the mother (care giver),

Prevention and control

1. Educate the public about the dangers of whooping cough and the advantages of initiating immunization at 6 weeks of age.

2. Consider protection of health workers at high risk of exposure by using erythromycin for 14 days.

Pneumococcal pneumonia

Definition;- An acute bacterial infection of the lung tissue and bronchi.

Infectious agent;- Streptococcus pneumonia (pneumococcus)

Epidemiology Occurrence- Endemicparticularly in infancy, old age and persons with underlying medical conditions. Epidemics can occur in institutions, barracks and on board ship where people are living and sleeping in close quarters. Common lower socio-economic groups and developing countries.

Reservoir- Humans - pneumococci are usually found in the URT of healthy people throughout the world.

Mode of transmission- droplet spread, direct oral contact or indirectly through articles freshly soiled with respiratory discharges. Person to person transmission is common.

Incubation period- not well determined, may be as short as 1-3 days.

Period of communicability- Until discharges of mouth and nose no longer contain virulent pneumococci in significant number.

Susceptibility and resistance- Susceptibility is increased by influenza, pulmonary edema of any cause, aspiration following alcohol intoxication, chronic lung disease, exposure to irritants in the air, etc. Malnutrition and low birth weight are important risk factors in infants and young children in developing countries. Immunity following an attack may last for years.

Clinical Manifestation

- Sudden onset of chill, fever, pleural pain, dyspnea, tachypnea, a cough productive of rusty sputum,
- Chest in drawing, shallow and rapid respiration in infants and young children.
- Vomiting and convulsion may occur in infants and young children.

Diagnosis

- Based on clinical grounds
- Chest X-ray- reveals consolidation of the affected lung tissue but not in children.
- Sputum gram stain- reveals gram negative diplococcic

Treatment

1. Antipyretic and antipain

2. Antibiotics like Ampicillin or procaine penicillin for adults but usually crystalline penicillin for children 3. Anticonvulsantsfor infants.

Nursing care

1. Monitor vital signs especially of children.

2. Maintain high body temperature to normal.

3. Intermittent administration of humidified oxygen if indicated especially for young children.

4. Timely administration of ordered medication.

Prevention and control

1. Treatment of cases

2. Treatment of other underlying medical conditions

3. Improved standard of living (adequate and ventilated housing and better nutrition)

4. Avoid overcrowding.

Meningococcal Meningitis

Definition ;- An acute bacterial disease that causes inflammation of the pia and arachnoid space.

Infectious agent ;- Neisseria meningitides (the meningococcal)

Epidemiology Occurrence- Greatest incidence occurs during winter and spring. Epidemics occur irregularly. Common in children and young adults. It is also common in crowded living conditions.

Reservoir- Humans

Mode of transmission- Direct contact with respiratory droplets from nose and throat of infected person.

Incubation period- 2-10 day, commonly 3-4 days.

Period of communicability-as long as the bacteria is present in the discharge.

Susceptibility and resistance- Susceptibility is low and decreases with age

Clinical Manifestation

- Sudden onset of fever, intense headache, nausea and often vomiting, neck stiffness and frequently, petechial rash with pink macules.
- Kernig's sign may be positive (i.e. patient feels back pain when one of the lower limbs is flexed at the knee joint and extended forward in an elevated position)
- Brudinski's sign may be positive (i.e. when the patient's neck is flexed, the two lower extremities get flexed or raised up).
- Delirium and coma often appear.

Diagnosis

- Based on clinical and epidemiological grounds
- White blood cell count. (neutrophils)
- Cerebrospinal fluid analysis (Gram stain, white cell count, etc.)

Treatment

1. Admit the patient and administer high dose of crystalline penicillin intravenously
2. Antipyretic

Nursing care

1. Maintain fluid balance (input and output)
2. Maintain body temperature to normal
3. Timely administration of antibiotics
4. Monitor vital signs.

Prevention and control

1. Educate the public on the need to reduce direct contact and exposure to droplet infection.
2. Reduce overcrowding in work places, schools, camps, etc.
3. Vaccines containing group A,C and Y strains.
4. Chemotherapy of cases.
5. Chemo prophylaxis (e.g. Rifampin for 2 days)
6. Report to the concerned health authorities.

Tuberculosis

Definition;- A chronic and infectious mycobacterial disease important as a major cause of illness and death in many parts of the world.

Infectious agent.

- Mycobacterium tuberculosis- human tubercle bacilli (commonest cause)
- Mycobacterium bovis- cattle and man infection
- Mycobacterium valium- infection in birds and man

Epidemiology

Occurrence- Worldwide, however underdeveloped areas are more affected. Affects all ages and both sexes. Age groups between 15-45 years are mainly affected. According to the WHO 1995 report, 9 million cases and 3 million deaths have occurred. According to the Ministry of Health report in 1993 E.C, tuberculosis was a leading cause of outpatient morbidity (ranked 8th with 2.2%), leading cause of hospitalization (ranked 3rd with 7.8%) and leading cause of hospital death (ranked 1st with 10.1%). Tuberculosis has two major clinical forms. Pulmonary (80%) primarily occurs during childhood and secondarily 15-45 years or later. The other is extra pulmonary, which affects all parts of the body. Most common sites are lymph nodes, pleura, Genitourinary tract, bone and joints, meninges and peritoneum.

Mode of transmission- Through aerosolized droplets mainly from persons with active ulcerative lesion of lung expelled during talking, sneezing, singing, or coughing directly. Untreated pulmonary tuberculosis positive (PTB+) cases are the source of infection. Most important is the length of time of contact an individual shares volume of air with an infectious case. That is intimate, prolonged or frequent contact is required. Transmission through contaminated fomites (clothes, personal articles) is rare. Ingestion of unpasteurized

milk transmits bovine tuberculosis. Overcrowding and poor housing conditions favor the disease transmission.

Incubation period- 4-12 weeks

Period of communicability- as far as the bacilli is present in the sputum

Susceptibility and resistance- under 3 years old children, adolescents, young adults, the very old and the immunosuppressed are susceptible. Everyone who is non-infected or non-vaccinated can be infected.

HIV is an important risk factor for the development of HIV- associated tuberculosis by facilitating: Reactivation or Progression of recent infection or Reinfection

Clinical Manifestation

Pulmonary tuberculosis

- Persistent cough for 3 weeks or more
- Productive cough with or without blood-stained sputum
- Shortness of breath and chest pain
- Intermittent fevers, night sweats, loss of weight, loss of appetite, fatigue and malaise.

TB lymph adenitis

- Slowly developing and painless enlargement of lymph nodes followed by matting and drainage of pus.

Tuberculosis pleurisy

- Pain while breathing in, dull lower chest pain, slight cough, breathlessness on exertion.

TB of bones and joints

- Localized pain and/or swelling, discharging of pus, muscle weakness, paralysis and stiffness of joints.

Intestinal TB

- Loss of weight and appetite
- Abdominal pain, diarrhea and constipation
- Mass in the abdomen
- Fluid in the abdominal cavity (ascites)

Tuberculosis meningitis

- Headache, fever, vomiting, neck stiffness and mental confusion of insidious onset.

Diagnosis

1. Clinical manifestations
2. Sputum smears for acid-fast bacilli (AFB), which is the Golden standard. However, one positive result does notjustify starting anti TB treatment since errors can never be excluded.
3. Acid-fast stain for AFB can be done for extra pulmonary tuberculosis having pus-y discharge.
4. Radiological examination: This is unreliable because it can be caused by a variety of conditions or previous TB patients who are healed may have chest x-ray giving the appearance of active TB, which requires treatment.
5. Histopathological examination: Biopsies for extrapulmonary TB (e.g. Tuberculos lymphadenitis)
6. Tuberculin test (mantoux): Helpful in non-BCG vaccinated children under 6 years of age
7. Culture: Complex and sophisticated tool, which takes several weeks to yield results. Not a primary diagnostic tool in our country.

Treatment

The following drugs are being used for treatment of TB in Ethiopia.

- Streptomycin (s) daily IM injection
- Ethambutol (E)
- Rifampin (R)
- Thiacetazone (T)
- Isoniazid (H)
- Pyrazinamide (Z)

All drugs, except streptomycin, which is administered daily through in route) are to be taken orally as a single daily dose preferably on an empty stomach.

Drug regimens (prescribed course of therapy)

1) Short course chemotherapy regimen (DOTS)

- Intensive phase- S(RH)Z for two months
- Continuation phase- TH (EH) for the next 6 months.

2) Long course chemotherapy regimen.

- Intensive phase- S(TH)or S(EH) for 2 months
- Continuation phase-TH or EH for the next 10 months

Nursing care

1. Educate the patient how and when to take the prescribed medication.
2. Tell the patient not to stop the medication unless he/she is told to do so.
3. Tell the patient to come to the health institution if he/she develops drug side effects.
4. Advice the patient on the importance of taking adequate and balanced diet and to eat what is available at home.

Prevention and control

1. Chemotherapy of cases
2. Chemoprophylaxis for contacts
    - INH (Isoniazid) for adults and children who have close contact with the source of infection
3. Immunization of infants with BCG
4. Educate patients with TB about the mode of disease transmission and how to dispose their sputum and cover their mouth while coughing, sneezing, etc.
5. Public health education about the modes of disease transmission and methods of control Improved standard of living
    - Adequate nutrition
    - Health housing
    - Environmental sanitation

- Personal hygiene; etc.
- Active case finding and treatment

Leprosy (Hansen's disease)

Definition;- A chronic bacterial disease of the skin, peripheral nerves and, in lepromatous patients, the upper airway

Infectious agent; -Mycobacterium leprae

Epidemiology Occurrence- Although common in rural tropics and subtropics, socio-economic conditions may be more important than climate itself. Endemic in south and southeast Asia, tropical Africa andLatin America.

Reservoir- Humans

Mode of transmission- Not clearly established. Household and prolonged close contact appear to be important. Millions of bacilli are liberated daily in the nasal discharges of untreated lepromatous patients. Cutaneous ulcers in lepromatous patients may shed large number of bacilli. Organisms probably gain access (entrance) through the URT and possibly through broken skin. In children less than one year of age, transmission is presumed to be transplacental.

Incubation period- 9 months to 20 years.

Period of communicability- Infectiousness is lost in most instances within 3months of continuous and regular treatment with dapsone or clofazamin or within 3 days of rifampicin treatment.

Susceptibility and resistance- The presence and form of leprosy depend on the ability to develop effective cell mediated immunity.

Clinical Manifestation Clinical manifestations vary between two polar forms: **lepromatous** and **tuberculoid leprosy.**

- **Lepromatous (Multibacillary form**)

Nodules, papules, macules and diffused infiltration are bilaterally symmetrical and usually numerous and extensive. Involvement of the nasal mucosa may lead to crusting, obstructed breathing and epistaxis. Occular involvement leads to iritis and keratitis.

- **Tuberculoid (Paucibacillary form)**

Skin lesions are single or few, sharply demarcated, anesthetic or hyperesthetic and bilaterally symmetrical. Peripheral nerve involvement tends to be severe.

- **Borderline**

Has features of both polar forms and is more liable to shift toward the lepromatous form in untreated patients and toward the tuberculoid form in treated patients.

Diagnosis

- Complete skin examination (hyperesthesia, anesthesia, paralysis, muscle wasting or trophic ulcer which are signs of peripheral nerve involvement) with bilateral palpation of peripheral nerves (ulnar nerve at the elbow, peroneal nerve at head of fibula and the great auricular nerve) for enlargement and tenderness.
- Skin lesions are tested for sensation (light touch, pink prick, temperature discrimination). Demonstration of AFB in skin smears made by scraped incision method.
- Skin biopsy confined to the affected area should be sent to the experienced pathologists in leprosy diagnosis.

Treatment

1. Dapsone

Three drugs for 12 months and then

2. Rifampicin

Dapsone alone for the next 12 months.

3. Clfazamin

4. Aspirin for mild reactions and inflammation

5. Severe reaction can be treated with corticosteroids

Arthropod or intermediate vector-borne diseases

Introduction

Generally speaking a vector is any carrier of disease, but in the case of the 'vector-borne diseases' we restrict the word to those invertebrate hosts (insects or snails), which are anessential part of the life cycle of the disease organism. A housefly just carrying bacteria or amoebic cysts on its feet to food is not regarded as a vector: this would be simple mechanical spread.

Insect vectors usually acquire the disease organism by sucking blood from infected persons, and pass it on, later, by the same route. There are other routes, however; infection may enter skin cracks or abrasions either from infected feces deposited when feeding, or from body fluid when an insect is crushed.

By definition the disease organism undergoes a period of development inside the vector, and the time taken for this is called the extrinsic incubation period.

Mosquito-Borne Diseases

Malaria

Definition;- An acute infection of the blood caused by protozoa of the genus plasmodium

Infectious agent.

- Plasmodium falciparum/malignant tertian: Invades all ages of red blood cells. Red blood cell cycle is 48 hours
- Plasmodium vivax/benign tertian: Invades reticulocytes only. Red blood cell cycle is 48 hours.
- Plasmodium ovale/tertian: Invades reticulocytes only. Red blood cell cycle is 48 hours.
- Plasmodium Malariae/Quartan malaria: Invades reticulocytes only. Red blood cell cycle is 72 hours.

Epidemiology Occurrence- Endemic in tropical and sub-tropical countries of the world. Affects 40% of the world population. Children less 5 years of age, pregnant women and travelers to endemic areas are risk groups. Plasmodium falciparum 60% and vivax 40% are common in Ethiopia.

Predisposing factors are:

- Environment- physical environment for the propagation
- Patient source
- Susceptible recipients
- Anopheles capable to transmit the parasite
- Socio-economic factors like immigration, war, poverty, ignorance, agricultural irrigation farms, etc.

Reservoir- Humans

Mode of transmission- By the bite of an infective female anopheles mosquito, which sucks blood for egg maturation. Blood transfusion, hypodermic needles, organ transplantation and mother to fetus transmission is possible. Since there is no pre-erythrocytic (tissue) cycle, the incubation period is short. Anopheles gambae and funestus are common vectors in Ethiopia.

Incubation period- Varies with species

- Plasmodium falciparum 7-14 day's
- Plasmodium vivax 8-14 days
- Plasmodium ovale 8-14 days
- Plasmodium malariae 7-30 days

Period of communicability- Mosquitoes are infective as long as infective gametocytes are present in the blood of patients. Once infected, mosquito remains infective for life.

Susceptibility and resistance- Susceptibility is universal except in some host-resistance factors:

Nonspecific factors

- Increased splenic clearance reaction
- Hyperpyrexia- which is said to be schizontcidal
- Sickle cell traits are resistant to plasmodium falciparum
- Duffy blood group deficiency (Duffy antigen negative red blood cells) lack receptor for plasmodium vivax.
- Because of passive immunity infants are resistant in early

Clinical Manifestation

- Chills, rigor, fever, head ache, diarrhea, hallucinations, abdominal pain, aches, renal or respiratory symptoms, jaundice, etc.

Diagnosis

- Clinical manifestation and epidemiological grounds
- Blood film for hemoparasite
- White blood cell count
- Blood culture to rule out sepsis
- Chest X-ray to rule out pneumonia.

Treatment

1. Plasmodium vivax, ovale and sensitive plasmodium falciparum
    - Chloroquine or
    - Fansidar
2. Chloroquine resistant falciparum and when sensitivity pattern is not known.
    - Quinine or
    - Fansidar

Nursing care

1. Advise patient to come back if the illness gets severe.
2. Advise on personal protection (bed nets, etc).
3. Reduce fever and maintain comfort.

Prevention and control

1. **Chemoprophylaxis**- for those who go to endemic areas but not for those who live in the endemic area (travelers and newcomers); for under-five children and pregnant mothers who have not enough immunity.

2**. Vector control**

- Avoiding mosquito breeding sites
- Residual DDT spray or other chemicals
- Personal protection against mosquito bite (use of bed nets, etc.)

3. **Chemotherapy of cases**

SELF-CHECK 3	WRITTEN TEST

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

1. Which is found worldwide in tropical and subtropical areas(1point)

   A P.falciparum B.P.malarae

   C. P.ovale D. P. vivax

2. Typical sign of cholera is(1 point)

   A. rice water diarrhea C. bloody diarrhea

   B. mucoid diarrhea D. constipation

3. Which of the following statements is false? In each case, state why it is incorrect(1 point).

   A. Typhoid fever is transmitted mainly indirectly by contaminated food or water.

   B. Diarrheal diseases can lead to severe dehydration and shock.

   C. Viruses are the commonest cause of diarrhea in children.

   D. The characteristic manifestations of cholera include bloody diarrhea

Note: **Satisfactory rating – 3 points** **Unsatisfactory - below 3 points**

Answer Sheet

Name: _____ Date: _____

Bancroftian filariasis

Definition; - A disease caused by the reaction of the body to the presence of worms in the lymphatic system.

Infectious agent;-

- Wucheriria bancrofti (vectors are culex, Anopheles and Aedes species)
- Brugia malayi and (vector is mansonia species)
- Brugia timori (vector is Anopheles

Epidemiology Occurrence- Widely prevalent in tropical and subtropical areas of Africa, Asia, Pacific Region, Central and South America. Found in Gambella region (western Ethiopia).

Reservoir- Humans are definitive hosts.

Mode of transmission- by bite of mosquito harboring infective larvae

Incubation period- one month, while allergic inflammatory manifestations may appear.

Period of communicability- Humans may infect mosquitoes when microfilariae are present in the peripheral blood. Microfilaremia may persist for 5-10 years or longer. The mosquito becomes infective about 12-14 days after an infective blood meal.

Susceptibility and resistance-Universal. Susceptibility to infection is probable.

Clinical Manifestation The presence of worms in the lymph vessels gives rise to a foreign-body reaction. After the death of the worm, more proteins are released; the reaction then is even more severe. Three phases may be distinguished.

Acute phase:

- Starts within a few months after infection
- Lymphadenopathy
- Fever
- Eosinophilia

in this stage microfilariae are not demonstrable in the peripheral blood because the worms are not yet mature. The acute phase is mainly due to a hypersensitivity reaction.

Sub-acute phase:

- ✓ This occurs after about one year following acute phases. In this phase worms have matured and micro filariae are present in the peripheral blood.
- ✓ Reactions to the adult worms cause attacks of fever with Lymphangitis, funiculitis or Epididymitis. Recurrent attacks will sooner or later lead to hydrocele.
- ✓ Lesions caused by microfilariae are less common and are associated with hypereosinophilia and lung symptoms (tropical pulmonary eosinophilia syndrome).

Chronic phase:

- ✓ After many years of repeated attacks, lymph glands and lymph vessels become obstructed; as a result lymph edema develops. Lymph edema most commonly seen in the legs or scrotum (elephantiasis) but may also be present in vulva, breasts, or arms.
- ✓ Since the adult worms have usually died, microfilariae are not seen in the blood

N:B Studies showed that elephantiasis of the lower legs is not encountered in Ethiopia. But there is elephantiasis of the foot called the big foot disease (elephantiasis of lower leg) as a result of accumulation of silica and other minerals in the leg (lymphatics) mostly occurring in bare-footed individuals. This big foot disease is named podoconiosis, which is common in the eastern high lands of Ethiopia (Wolayita, Gojjam, Gondar, Gedeo, Sidamo, etc.).

Diagnosis

- Clinical and epidemiological grounds
- Obstructive signs with history and travel to and residence in endemic areas.
- Best established by identifying microfilariae in the peripheral blood (blood film). Before taking blood sample one should know the periodicity of microfilariae. That is, microfilariae appear in the peripheral blood during the night (nocturnal) in most parts of the world and during day (diurnal) in the South Pacific region.

- Single dose of Diethylcarbamazin Citrate (DEC) causes the sequestered microfilariae to emerge to blood 45-60 minutes later. This test is said to be the mazoti test, which is used in nocturnal periodicity.

Treatment

1. Diethyl carbamazin Citrate (DEC) results in rapid disappearance of most microfilariae from blood but may not destroy the adult worm. Because of this, we need to repeat DEC annually for some years.
2. Refer the patient for surgical treatment of hydrocele.

Prevention and control

1. Reducing the vector population
2. Mass and selective treatment
3. Personal protection against mosquito bite.

Yellow fever

Definition;- An acute infectious viral disease of short duration and varying severity.

Infectious agent;- Yellow fever virus

Epidemiology Occurrence- The disease exists in two transmission cycles. Namely, the sylvatic or Jungle cycle, which occurs between mosquitoes and non-human primates, and an urban cycle,

involving Aedes aegypti mosquitoes and humans. Found in southwest Ethiopia (Gambella region).

Reservoir- Urban areas- humans and Aedes aegypti mosquitoes. Forest areas- Vertebrates other than humans (mainly monkeys) and forest mosquitoes.

Mode of transmission- By the bite of infective Aedes aegypti mosquitoes

Incubation period- 3-6 days

Period of communicability- Blood of patients is infective for mosquitoes shortly before onset of fever and for the first 3-5 days of illness. Not communicable by contact or common vehicles. The disease is highly communicable where many susceptible people and abundant vector mosquitoes co-exist.

Susceptibility and resistance- Recovery from yellow fever is followed by lasting immunity; second attacks are unknown. Transient passive immunity in infants born to immune mothers may persist for up to 6 months. In natural infections, antibodies appear in the blood within the first week

Clinical Manifestation

- Typical attacks are characterized by sudden onset of fever, chills, headache, backache, generalized pain, prostration, nausea and vomiting.
- Slow and weak pulse.
- Bleeding tendency is common resulting in epistaxis, bleeding of gums, hematemesis, melena. ƒ Jaundice occurs due to liver cell necrosis and this may result in liver failure and death.
- Albumin uria occurs due to nephritis and this may result in kidney failure and anuria. Patients surviving the seventh day of the disease usually recover.

Diagnosis

- History of residence and/or travel to endemic area
- Clinical manifestation

Treatment

No specific treatment.

Nursing care

1. Monitor vital signs regularly.
2. Maintain body temperature to normal.
3. Monitor input and output balance.
4. Keep patient in screened rooms or under mosquito nets to avoid further infection.

Prevention and control

1. Active immunization of all people greater than 9 months of age necessarily exposed to infection because of residence, occupation or travel.
2. Eradication or control of Aedes aegypti mosquitoes in urban areas.

Question

Choose the best answer

1. A systemic infectious disease characterized by high continuous fever, malaise and involvement of lymphoid tissues

A. Typhoid fever B.Bacillary Dysentery C.Shigellosis D. A& B

2. Clinical manifestation of Typhoid fever in first week

A. Anorexia B. Abdominal distention C. Temperature decrease D**.** All

3. Infectious agent Bacillary Dysentery

A. Shigella dysenteries B. Shigella flexneri C. Shigella boydii D. All

4. All are Clinical Manifestation of BacillaryDysentery Excepts

A. Fever, rapid pulse, vomiting and abdominal cramp are prominent

B. Withdysentery, feces are generally watery, containing mucus and blood

C. Dehydration is common and dangerous

D.Generalized abdominal tenderness

5. Prevention and control method of Bacillary Dysentery

A. Hand washing after toilet and before handling or eating food

B. Adequate and safe water supply

C. Control of flies

D. All

6. A protozoan infection principally of the upper small intestine associated with symptoms of chronic diarrhea, steatorrhea abdominal cramps, bloating, frequent loose and pale greasy stools, fatigue and weight loss.

A. Cholera B. Giardiasis C. Ascariasis D. All

7. A helminthic infection of the small intestine generally associated with few or no symptoms.

A. Ascariasis B. Trichuriasis C.Entrobiasis D. None

8. A common intestinal helminthic infection that is often asymptomatic

A. Entrobiasis B. Oxyuriasis C. pinworm infection D.All

9. An often asymptomatic helminthic infection of the duodenum and upper jejunu

A. Ancylostomiasis B. Necatoriasis C. Strongyloidiasis D. None

10. Diseases transmitted mainly through direct contact with feces of the infected person

A.Poliomyelitis B. Hydrated Disease C.Echinococcosis D, All

11. True about Hydrated Disease are

A. Children are more likely to be exposed to infection

B. Variable from 12 months to many years

C. Reservoir Domestic dogs and other canids are definitive hosts

D.All

12. An acute catarrhal infection of the upper respiratory tract

A.Common Cold B. Acute Viral Rhinitis C. Coryza D, All

13. The Infectious agent of Rubella

A. Measles virus B.Rhino viruses C. Adeno viruses D.All

14. Treatment of Influenza

A. Anti-pain and antipyretic

B. High fluid intake

C.Bed rest

D. Balanced diet intake

E. None

15. An acute bacterial disease involving primarily tonsils, pharynx, nose, occasionally other mucus membranes or skin and some times the conjunctiva or genitalia

A. Diphtheria B. Pertussis C. whooping cough **D.All**

Answer sheet

1. _____ 2. _____ 3. _____ 4. _____ 5. _____ 6. _____ 7. _____ 8. _____
9. _____ 10. _____ 11. _____ 12._____ 13. _____ 14. _____ 15. _____

1. _____
_____

2. _____ 3. _____

4. _____

_____

_____

_____

INFORMATION SHEET 3- NEGLECTED TROPICAL DISEASES

3.1. INTRODUCTION

Most resources dedicated to improving the health of the world's poor are justifiably directed towards fighting the three most devastating diseases, HIV/AIDS, tuberculosis and malaria. Prominent partnerships and initiatives are now devoted to these 'big three' and have managed to raise considerable funds and awareness.

However, an equal amount of advocacy for the control of a group of diseases that exclusively affect the poor in rural and impoverished urban areas of low-income countries has been conspicuously absent.

The most important of these 'neglected tropical diseases' (NTDs) are three vector-borne protozoan infections – leishmaniasis, human African trypanosomiasis (HAT) and Chagas disease; three bacterial infections – trachoma, leprosy and Buruli ulcer; and sevenhelminthes infections – hookworm, ascariasis, Trichuriasis, lymphatic filariasis (LF), onchocerciasis, guinea worm and schistosomiasis .

Uganda, as most other developing countries, is affected by a high burden of infectious and parasitic diseases, most of which are readily preventable and/or treatable. Many of these endemic diseases fall into the category of NTDs.

The ones that have been reported in Uganda are visceral leishmaniasis (VL, also called kala-azar), HAT, trachoma, leprosy, Buruli ulcer, soil-transmitted helminthes infections (STH, i.e. hookworm, ascariasis and Trichuriasis), podoconiosis, LF, onchocerciasis, dracunculiasis and schistosomiasis.

The populations affected by them are largely poor and marginalized with limited access to health care. These features explain, at least in part, their relative neglect by the public health community despite the availability of cost-effective tools and proven strategies for their control.

The aim of this document is conduct a situation analysis of the burden and control of NTDs and to provide specific recommendations on how the Malaria Consortium (MC) can respond to NTDs and thus contribute to putting HSSP II into practice.

To set the scene, each disease is introduced in general, followed by national specifics on its distribution, burden, history of control and current needs. The potential for new approaches to improve on existing national initiatives is explored.

World Health organization (WHO) lists eight diseases that occur exclusively or especially in the tropics and states that, for all practical purposes, the designation refers to infectious diseases that proliferate in hot and humid weather conditions.

- ✓ Some of these diseases are caused by protozoa, such as malaria, leishmaniasis, Chagas' disease and sleeping sickness.
- ✓ Others are caused by worms, including schistosomiasis, onchocerciasis and lymphatic filariasis. One is viral, dengue fever.
- ✓ The eight WHO tropical diseases are transmitted to humans by various means, but always include a vector that is generally a hematophagous insect.
- ✓ Schistosomiasis has no vector, but rather intermediary hosts – snails – that release in water the infectious forms for humans

Leishmaniasis

The parasite and its life-cycle: The leishmaniases are a group of diseases caused by over 17 species of the protozoan Leishmania parasite.

Infection is transmitted by the bite of phlebotomies sandflies and results in cutaneous, mucosal or visceral manifestations.

Disease burden: In terms of global disease burden, the leishmaniasis are the third most important vector-borne disease (after malaria and lymphatic filariasis), responsible for an estimated 2.1 million DALYs and 51000 deaths annually (WHO 2004a). These figures are thought to be an underestimate, as only 40 of 88 endemic countries consider leishmaniasis a reportable disease (Croft et al. 2003

Geographical distribution: Much of the disease burden due to the leishmaniases in Africa is concentrated in East Africa. Here, VL or 'kala-azar' is endemic in remote regions of Uganda, Sudan, Ethiopia and Kenya. In this part of the world it is caused by Leishmania donovani.

Clinical features: VL is characterized by fever, hepatosplenomegaly, and cachexia (wasting and weakness). Up to 90% of untreated cases eventually die due to organ failure, anemia or secondary infections**.**

Control options: Classically the diagnosis of VL is confirmed by demonstration of the parasite. IntracellularLeishmania can be identified from aspirates of the spleen, bone marrow, lymph node or liver. Diagnostic yield with this method is highest, but there are contraindications, precautions are necessary and complications, though rare, may be serious . Serological techniques (enzyme-linked immunosorbent assay, direct agglutination test and immunochromatographic strips) have been developed for field use. PCR is still not easily useable in the field

Leishmaniasis and its control

VL is transmitted by the sand-fly vector Phlebotomus martini and transmission is thought to be anthroponotic (humans are the sole reservoir

Human African Trypanosomiasis

HAT, also known as sleeping sickness, is a severe disease that is fatal if left untreated. The parasite and its life cycle: HAT is caused by protozoan parasites of the genus Trypanosoma, which is transmitted between infected humans and animals by tsetse flies (Glossina spp.) and enters the blood stream during blood feeding. Two species of Trypanosoma cause HAT, Trypanosoma brucei rhodesiense and T. b. gambiense**.**

Disease burden: HAT occurs in both epidemic and endemic patterns across more than 200 foci throughout Sub-Saharan Africa. Latest WHO estimates put the number of cases at 300,000 to 500,000, with 100,000 dying every year

The extrapolated estimates are somewhat imprecise, since less than 10% of the population at risk of HAT (about 60 million people) is under surveillance . In terms of DALYs lost, HAT ranks third among parasitic diseases, behind malaria and lymphatic filariasis and ahead of leishmaniasis, schistosomiasis and onchocerciasis

Geographical distribution: T. b. rhodesiense occurs mainly in east and southern Africa, while T.b. gambiense mainly occurs in west and central Africa. Antelopes, hyenas, lions, sheep and cattle can serve as a reservoir for T. b. rhodiense (zoonosis), whereas humans are the only known reservoir for T. b. gambiense. In animals, many other Trypanosoma species are known to cause Trypanosomiasis also called Nagana, next to T. b. rhodiense**.**

Clinical features: Once inside the human host, trypanosomes multiply and invade most tissues. Infection leads to malaise, lassitude and irregular fevers. Early symptoms,

including fever and enlarged lymph glands and spleen, are more severe and acute in T.b. rhodesiense infections**.**

Early signs are followed by a range of symptoms including headache, anemia, joint pains, swollen tissues and a primary chancre; advanced symptoms include neurological and endocrine disorders. As the parasites invade the central nervous system, mental deterioration begins, leading to coma and death. T.b rhodesiense infection is usuallyacute, causing severesymptomsand death within a few days or weeks. T.b. gambiense infection tends to progress more slowly (over several years) and is less severe.

Control options: Control of T. b. gambiense involves active case-finding and screening of the population with the card-agglutination test; for T. b. rhodesiense passive case-finding, based on clinical algorithms, is recommended because diagnostic tools are not readily available.

Treatment of infected people has always been difficult and expensive, as few effective drugs are available and it requires specialized administration of drugs and long period of hospital care.

In addition, reduction of tsetse fly numbers can play a significant role, especially against the rhodesiense form of the disease. In the past, this has involved extensive clearance of bush to destroy tsetse fly breeding and resting sites, and widespread application of insecticides. More recently, efficient traps and screens have been developed that can keep tsetse populations at low levels. However, this method has proven difficult to sustain for various reasons, including physical degradation, damage, theft and lack of education in use of the traps.

1.3 Soil Transmitted Helminths

The parasite and its life cycle: STHs are also known as common intestinal worms. In terms of public health, three types are important: roundworms (Ascaris lumbricoides), hookworms (Ancylostoma duodenale and Necator americanus), and whipworms (Trichuris trichuria).

A person infected with STH has parasite eggs in their faeces. In areas where there is no latrine system, the soil and water around the community become contaminated with faeces containing worm eggs. In the soil, the eggs mature over 2 to 4 weeks, depending on the type of worm and environmental conditions, and then infect humans by being ingested or by penetrating the skin (hookworms only)

Disease burden: Globally, it is estimated that over a billion people living in the tropics and subtropics are infected with STHs. Although the largest numbers of infections occur in Asia, the greatest burden of disease occurs in Africa since the morbidity caused by STHs is related to the intensity of infection and host nutrition, and infections are most intense and nutrition woefully inadequate in Africa

Clinical features: The symptoms of infections are non-specific and only become evident when the infection is particularly intense. Non-specific symptoms include nausea, tiredness, and abdominal pain, loss of appetite and, in children, a cough or wheeze.

Chronic and intense STH infections can contribute to malnutrition and iron-deficiency anemia, and also can adversely affect physical and mental growth in childhood.

Control options: Current efforts to control STH infection, as well as schistosomiasis, focus on the school-age population. The cornerstone of control is population-based chemotherapy, especially targeting schoolchildren. School-age children are the natural targets for treatment, and school-based treatment delivery programmes offer major cost advantages because of the use of the existing school infrastructure and the fact that schoolchildren are accessible through schools.

- There are four drugs to treat STH infections (see annex 1 for spectrum of anthelminthic activity): Albendazole (ABL) and Mebendazole (MEB) are particularly attractive because they are easy to administer.
- Pyrantel pamoate (PYR) and levamisole (LEV) are alternatives for treatment of hookworm and Ascaris infections the former is not effective for treatment of Trichuriasis and they are administered by bodyweight.
- As a general strategy, WHO recommends that in areas where STH prevalence is ≥ 50% treatment is provided twice yearly, in areas where prevalence is between 20 – 49% annual treatment is provided and in areas with prevalence < 20% drugs are made available at the health facility.

1.4 Schistosomiasis

The parasite and its life cycle: On the African continent human schistosomiasis, a water-borne disease, is caused by three species of blood flukes called schistosomiasis: Schistosoma mansoni causes intestinal schistosomiasis; S. haematobium causes urinaryschistosomiasis; and to alesser extent S. intercalatum which also causes intestinal schistosomiasis**.**

- ✓ The schistosomes require a molluscan intermediate host in which to undergo development. Freshwater snails from four different genera form an essential component in the life cycle of the four major schistosome species that are responsible for human schistosomiasis.
- ✓ This ties transmission of the disease to places where people and snails come together at the same water habitat. Hence, schistosomiasis tends to be commonly found in rural communities where contact with freshwater bodies is a routine and inevitable occurrence**.**

Disease burden: Among human parasitic diseases, schistosomiasis, sometimes called bilharzias is, ranks second behind malaria in terms of socio-economic and public health importance in tropical and subtropical areas.

The disease is endemic in 74 developing countries, infecting more than 200 million people in rural agricultural and peri-urban areas. Of these, 20 million suffer severe consequences from the disease and 120 million are symptomatic. In many areas, schistosomiasis infects a large proportion of children under 14 years. An estimated 500-600 million people worldwide are at risk from the disease.

Clinical features: Disease is caused primarily by schistosome eggs, which are deposited by adult worms in the blood vessels surrounding the bladder or intestines, depending on the specific species. S. haematobium causes bladder wall pathology, leading to ulcer formation, hematuria, and dysuria.

Granulomatous changes and ulcers of the bladder wall and ureter can lead to bladder obstruction, secondary urinary tract infections and subsequent bladder calcification, renal failure, lesions of the female and male genital tracts, and hydronephrosis.

The morbidity commonly associated with S. mansoni infection includes lesions of the liver, portal vein, and spleen, leading to perioral fibrosis, portal hypertension, hepatosplenomegaly, and ascites. Schistosomiasis also causes chronic growth faltering and can contribute to anemia

Control options: Schistosomiasis control aims to reduce the amount of disease, rather than to halt transmission entirely. The main strategy for controlling morbidity due to schistosomiasis is based on chemotherapy using praziquantel (PZB). Even though re-infection may occur after treatment, the risk of developing severe organ pathology is diminished and even reversed in young children

1.5 Lymphatic Filariasis

LF, more commonly known as elephantiasis, is a painful and profoundly disfiguring disease**.**

The parasite and its life cycle: LF is caused by infection with mosquito-borne, parasitic worm of the genera Wucheriria and Brugia.

Bancroftian filariasis, caused by Wucheriria bancrofti, is mainly transmitted by Culex quinquefasciatus and by some species of Anopheles and Aedes.

Infective larvae are transmitted to humans during blood feeding by infected mosquitoes. The parasites are deposited in the vicinity of the skin puncture wound, from where they penetrate the skin and migrate to the lymphatic vessels.

Over a period of 6 - 12 months, they develop into adult worms that cause damage and dilatation of the lymphatic vessels. The filariae live for several years in the human host. During this period they produce millions of young stages of microfilariae that circulate in the peripheral blood and are ingested by mosquitoes when these bite infected humans. The larval forms further develop inside the mosquito before becoming infectious to man**.**

Disease burden: LF puts at risk more than a billion people in more than 80 countries. Over 120 million are estimated to be affected by it, of which over 40 million are seriously incapacitated and disfigured. Recent estimates indicate that more than 50 million people in sub-Saharan Africa are affected, accounting for 37% of the global burden.

Clinical features: While LF is usually acquired in childhood, its visible manifestations occur in adults where they lead to temporary and permanent disability. As such, the disease has a major social and economic impact on endemic countries.

LF is now recognized as a major source of morbidity and physical disability and has been ranked by WHO as the second major cause of long-term disability after mental illness (WHO 1999). Filariae lodge in the lymphatic system where they cause inflammation, dilatation and lymphatic system failure.

They are responsible for a variety of clinical manifestations, including lymphedema of the limbs, genital disease (hydrocele, chylocele and swelling of the scrotum and penis) and acute, recurrent secondary bacterial infections known as "acute attacks".

The vast majority of infected people are asymptomatic, but virtually all of them have sub clinical lymphatic damage and as many as 40% have renal involvement.

Control options: The strategy of the Global Programmed to Eliminate Lymphatic Filariasis (PELF) has two components: firstly to interrupt transmission and secondly to alleviate the suffering of affected individuals. To interrupt transmission, endemic districts must be identified and mass drug administration (MDA) be implemented to treat the entire at-risk population. In most countries this will be based on once-yearly administration of single doses of two drugs given together: ALB plus either Diethylcarbamazin (DEC) or IVN, the latter in areas where either onchocerciasis or loiasis may also be endemic.

This yearly single-dose treatment must be carried out for 4-6 years. To alleviate the suffering caused by the disease, community education is used to raise awareness in affected patients. This promotes the benefits of intensive local hygiene and the possible improvement, both in the damage that has already occurred and in preventing the debilitating and painful acute episodes of inflammation. In addition to MDA, vector control is carried out where this is feasible. The control of Culex is normally based on measures aimed at the prevention of breeding.

1.6 Onchocerciasis

The parasite and its life cycle: Onchocerciasis is an eye and skin disease caused by the worm Onchocerca volvulus. It is transmitted to humans through the bite of blackflies which breed in fast-flowing streams and rivers in the inter-tropical zones.

- Living near these breeding sites increases the risk of blindness, hence the commonly known name ‘river blindness.

Disease burden: Onchocerciasis is the world's second leading infectious cause of blindness. Prior to concerted control efforts, about 50% of men over the age of 40 years in some West African communities had been blinded by the disease.

- People therefore fled the fertile river valleys to settle in less productive upland country. In the 1970s, the resulting annual economic losses were estimated at US$ 30 million. According to recent estimates, 120 million people are at risk and 18 million are already infected. The disease is responsible for the loss of 1 million DALYs per year.

Clinical features: Inside the human body, the adult female worm (macrofilaria) produces thousands of larvae (microfilariae) that migrate in the skin and the eye. The death of microfilariae is very toxic to the skin and the eye, producing terrible itching and various eye manifestations (lesions).

- After repeated years of exposure, these lesions may lead to irreversible blindness and disfigurative skin diseases sometimes named "leopard" skin and "lizard" skin.

Control options: Because of the dramatic consequences of onchocerciasis in West Africa, WHO in 1974 launched the Onchocerciasis Control Programme (OCP) in collaboration with the World Bank, the United Nations Development Programme (UNDP) and the Food and Agriculture Organization (FAO). Control of the vector by treating the breeding sites with larvicides was the only available approach.

The programme systematically expanded over its first few years to achieve full coverage of several river systems in seven countries. Nonetheless, even this ambitious start was not sufficient and the programme subsequently doubled in size to cover 11 countries. At this point the programme stretched over 1 200 000 Km^2 to protect 30 million people. Vector control was the primary strategy in West Africa, and it was supplemented by drug distribution as of 1989-90. The OCP was officially closed in December 2002 after virtually stopping the transmission of the disease in all participating countries except Sierra Leone where operations were interrupted by a decade-long civil war

1.7 Buruli Ulcer

The parasite and its life-cycle: Buruli ulcer is caused by Mycobacterium ulcerans and was named after an area of Uganda that was the site of many cases in the 1960s (Clancey et al., 1962).

The causative organism belongs to the family of bacteria that cause tuberculosis and leprosy. Most patients are women and children who live in rural areas near rivers or wetlands. The exact mode of transmission remains enigmatic however, it has recently been suggested that it may be transmitted by biting water bugs, which means that it might be classified as a vector-borne disease An alternative mode of transmission may involve penetrating skin injuries during fishing or farming activities that seed the micro-organism into subcutaneous tissues (Meyers et al. 1974

Disease burden: Buruli ulcer is the third most common mycobacterial infection in healthy people after tuberculosis and leprosy and the most poorly understood of these three diseases. In Côte d'Ivoire, approximately 15,000 cases have been recorded since 1978 where up to 16 percent of the population in some villages are affected. In Benin, 4,000 cases have been recorded since 1989; in Ghana (6,000 recorded cases in a national surveyin 1999) up to 22 per cent of villagers are affected in some areas. There is evidence of huge under-reporting of the disease

Clinical features: The disease often starts as a painless swelling in the skin and mainly occurs in the limbs. A nodule develops beneath the skin's surface teeming with mycobacteria. Unlike other mycobacteria, M. ulcerans produces a toxin, which destroys tissue and suppresses the immune system. Massive areas of skin and sometimes bone are destroyed causing gross deformities. When lesions heal, scarring may cause restricted movement of limbs and other permanent disabilities. One important feature of Buruli ulcer is the minimally painful nature of the disease, which may partly explain why those affected do not seek prompt treatment (v. d. Werf et al. 2005)**.**

Control options: Treatment of Buruli ulcer with antibiotics has been unsuccessful to date although the organism is sensitive in-vitro to some of the antibiotics used for treatment of tuberculosis. At present, the only treatment available is surgery to remove the lesion followed by a skin graft if necessary. This is both costly and dangerous, leading to the loss of large amount of tissues/or permanent disability, and it does not prevent recurrence (v. d. Werf et al. 2005). Early detection and surgical removal of small lesions could prevent many complications. BCG (Bacille Calmette-Guérin) vaccination appears to offer some short-term protection from the disease. At the present time, BCG vaccination is the only biomedical intervention that may help control Buruli ulcer in the highly affected areas

Other Neglected Tropical Diseases

Leprosy

Leprosy is a chronic infectious disease caused by Mycobacterium leprae, an acid-fast, rod-shaped bacillus. The disease mainly affects the skin, the peripheral nerves, mucosa of the upper respiratory tract and the eyes. At present it occurs in 15 countries and territories in Africa, Asia and Latin America.

Leprosy is a disease caused by a type of bacteria called Mycobacterium leprae. These bacteria attack nerves in the hands, feet and face, causing numbness and loss of sensation to those parts of the body. It can also affect the nose and the eyes**.**

- Early signs include discoloration or light patches on the skin with loss of sensation. When nerves in the arm are affected, part of the hand becomes numb and small muscles become paralyzed, leading to curling of the fingers and thumb. When leprosy attacks nerves in the legs, it interrupts communication of sensation to the feet. As a result, the person does not feel pain, and can have injuries to their hands and feet without realizing it. The damaged nerves also lead to the skin peeling off, and the tissue beneath the skin is exposed.
- The signs and symptoms vary considerably, depending on the patient's resistance to the disease. They can be easily missed or mistaken for some other disease**.**
- Transmission is thought to only occur between humans, via nasal discharge and droplets from the respiratory tract of untreated patients with severe disease, although it may also occur via skin contact. Humans seem to be the only natural host of M. leprae**.**

The clinical course varies from asymptomatic infections through to severe disfiguring disease. Following infection, skin lesions may appear and heal spontaneously. Infection slowly affects the skin, nerves and mucous membranes. As the disease progresses (usually over a period of several years) skin lesions may increase in number or spread. Lesions of the nerves can lead to loss of sensation and to muscle weakness and atrophy, and unnoticed burns and ulcers - especially on the hands and feet - resulting in deformities.

Leprosy should be suspected if a person shows the following signs and symptoms:

- ✓ dark-skinned people might have light patches on the skin, while pale-skinned people have darker or reddish patches
- ✓ loss or decrease of sensation in the skin patch
- ✓ Numbness or tingling of the hand or feet
- ✓ Weakness of the hands, feet or eyelids
- ✓ Painful or tender nerves
- ✓ Swelling or lumps in the face or earlobes
- ✓ Painless wounds or burns on the hands or feet.

The treatment for leprosy is called multidrug therapy (MDT). It is a combination of drugs depending upon the type of leprosy. Studies show that MDT is highly effective against leprosy and has minimal side-effects

Dracunculiasis (Guinea Worm)

Dracunculiasis, also called Guinea-worm disease (GWD), is a parasitic infection by the Guinea worm. A person becomes infected when they drink water that contains water fleas infected with guinea worm larvae. Initially there are no symptoms About one year later, the female worm forms a painful blister in the skin, usually on a lower limb. Other symptoms at this time may include vomiting and dizziness\ The worm then emerges from the skin over the course of a few weeks During this time, it may be difficult to walk or work. It is very uncommon for the disease to cause death

In humans, the only known cause is Dracunculus medinensis The worm is about one to two millimeters wide, and an adult female is 60 to 100 centimeters long (males are much shorter at 12–29 mm or 0.47–1.14 in). Outside humans, the young form can survive up to three weeks during which they must be eaten by water fleas to continue to develop The larva inside water fleas may survive up to four months Thus, for the disease to remain in an area, it must occur each year in humans A diagnosis of the disease can usually be made based on the signs and symptoms

Signs and symptoms

- Dracunculiasis is diagnosed by seeing the worms emerging from the lesions on the legs of infected individuals and by microscopic examinations of the larvae
- As the worm moves downwards, usually to the lower leg, through the subcutaneous tissues, it leads to intense pain localized to its path of travel. The burning sensation experienced by infected people has led to the disease being called "the fiery serpent".
- Other symptoms include fever, nausea, and vomiting Female worms cause allergic reactions during blister formation as they migrate to the skin, causing an intense burning pain. Such allergic reactions produce rashes, nausea, diarrhea, dizziness, and localized edema.
- When the blister bursts, allergic reactions subside, but skin ulcers form, through which the worm can protrude. Only when the worm is removed is healing complete.
- Death of adult worms in joints can lead to arthritis and paralysis in the spinal cord.

Cause

- Dracunculiasis is caused by drinking water contaminated by water fleas that host the Dracunculiasis medinensis larvae.
- Dracunculiasis has a history of being very common in some of the world's poorest areas, particularly those with limited or no access to clean water In these areas,

stagnant water sources may still host copepods, which can carry the larvae of the guinea worm.

- After ingestion, the copepods die and are digested, thus releasing the stage 3 larvae, which then penetrate the host's stomach or intestinal wall, and then enter into the abdominal cavity and retroperitoneal space. After maturation, which takes approximately three months, mating takes place; the male worm dies after mating and is absorbed by the host'

Treatment

here is no vaccine or medicine to treat or prevent Guinea worm diseaseUntreated cases can lead to secondary infections, disability and amputationsOnce a Guinea worm begins emerging, the first step is to do a controlled submersion of the affected area in a bucket of water. This causes the worm to discharge many of its larvae, making it less infectious. The water is then discarded on the ground far away from any water source. Submersion results insubjective relief of the burning sensation andmakes subsequent extraction of the worm easier. To extract the worm, a person must wrap the live worm around a piece of gauze or a stick. The process may take several weeksGently massaging the area around the blister can help loosen the worm This is nearly the same treatment that is noted in the famous ancient Egyptian medical text, the Ebers papyrus from Some people have said that extracting a Guinea worm feels like the afflicted area is on fire

However, if the infection is identified before an ulcer forms, the worm can also be surgically removed by a trained doctor in a medical facility.

Prevention

1. Prevent people from drinking contaminated water containing the *Cyclops* copepod (water flea), which can be seen in clear water as swimming white specks.

- ✓ Drink water drawn only from sources free from contamination.
- ✓ Filter all drinking water, using a fine-mesh cloth filter, to remove the guinea worm-containing crustaceans. Regular cotton cloth folded over a few times is an effective filter. A portable plastic drinking straw containing a nylon filter has proven popular
- ✓ Filter the water through ceramic or sand filters.
- ✓ Boil the water.
- ✓ Develop new sources of drinking water without the parasites, or repair dysfunctional water sources.
- ✓ Treat water sources with larvicides to kill the water fleas.

Trachoma

- Trachoma is a disease of the eye caused by infection with the bacterium Chlamydia trachomatis.
- It is a public health problem in 44 countries, and is responsible for the blindness or visual impairment of about 1.9 million people.
- Blindness from trachoma is irreversible.
- Based on March 2019 data, 142 million people live in trachoma endemic areas and are at risk of trachoma blindness.

- Infection spreads through personal contact (via hands, clothes or bedding) and by flies that have been in contact with discharge from the eyes or nose of an infected person. With repeated episodes of infection over many years, the eyelashes may be drawn in so that they rub on the surface of the eye, with pain and discomfort and permanent damage to the cornea

Distribution

- Trachoma is hyper endemic in many of the poorest and most rural areas of 37 countries of Africa, Central and South America, Asia, Australia and the Middle East.
- It is responsible for the blindness or visual impairment of about 1.9 million people. It causes about 1.4% of all blindness worldwide.
- Overall, Africa remains the most affected continent, and the one with the most intensive control efforts.
- As of 2 January 2020, 13 countries had reported achieving elimination goals. These countries are: Cambodia, China, Gambia, Ghana, Islamic Republic of Iran, Iraq, Lao People's Democratic Republic, Mexico, Morocco, Myanmar, Nepal, Oman and Togo. Eight of those countries – Cambodia, Islamic Republic of Iran, Lao People's Democratic Republic, Ghana, Mexico, Morocco, Nepal and Oman – had been validated by WHO as having eliminated trachoma as a public health problem

Prevention and control

Elimination programmes in endemic countries are being implemented using the WHO-recommended SAFE strategy. This consists of:

- ✓ Surgery to treat the blinding stage (trachomatous trichiasis);
- ✓ Antibiotics to clear infection, particularly mass drug administration of the antibiotic azithromycin, which is donated by the manufacturer to elimination programmes, through the International Trachoma Initiative;
- ✓ Facial cleanliness; and

- ✓ Environmental improvement, particularly improving access to water and sanitation.
- ✓ Most endemic countries have agreed to accelerate the implementation of this strategy to achieve elimination targets**.**
- ✓ Data reported to WHO by Member States for 2018 show that 146 112 people with trachomatous trichiasis were provided with corrective surgery in that year, and 89.1 million people in endemic communities were treated with antibiotics to eliminate trachoma.
- ✓ Elimination efforts need to continue to satisfy the target set by World Health Assembly resolution WHA 51.11, which is elimination of trachoma as a public health problem (1). Particularly important will be the full engagement of multiple actors involved in water, sanitation and socioeconomic development.

Podoconiosis

Podoconiosis, also known as non-filarial elephantiasis, is a disease of the lymphatic vessels of the lower extremities that is caused by chronic exposure to irritant soils.

It is the second most common cause of tropical lymphedema after lymphatic filariasis, and it is characterized by prominent swelling of the lower extremities, which leads to disfigurement and disability.

Methods of prevention include wearing shoes and using floor coverings. Mainstays of treatment include daily foot hygiene, compression bandaging, and when warranted, surgery of overlying nodules

Podoconiosis causes bilateral yet asymmetrical leg swelling with overlying firm nodules. Early on, symptoms may include itching, tingling, widening of the forefoot, and swelling which then progress to soft edema, skin fibrosis, papillomatosis, and nodule formation resembling moss, giving rise to the disease's alternate name of "mossy foot" in some regions of the world.

As with other forms of tropical lymphedema, chronic disease can lead to rigid toes, ulceration, and bacterial superinfection.

During acute episodes of adenolymphangitis, patients may develop fevers, extremity warmth, redness, and pain. These episodes are extremely debilitating and account for many days of activity and productivity loss each year.

SELF-CHECK -6 **WRITTEN TEST**

Choose the best answer

1. is transmitted by the bite of phlebotomies sandflies and results in cutaneous, mucosal or visceral manifestations

A. Leishmaniasis B. Human African Trypanosomiasis

C. Schistosomiasis D. None

2. W/c one is intestinal schistosomiasis;

A. Schistosome manson B. S. haematobium

3. W/C one is urinary schistosomiasis

A, Schistosome mansoni B. S. haematobium

4. A water-borne disease, is caused by three species of blood flukes called

A Schistosomiasis B.Lymphatic Filariasis C.Bancroftian filariasisD. None

5. W/C one is the Clinical features of S. haematobium

A. bladder wall pathology

B. leading to ulcer formation,

C. Hematuria and dysuria.

D. All

6. All are true about S. mansoni infection Excepts

A. Lesions of the liverportal vein, and spleen

B. Hepatosplenomegaly

C. Ascites

D. lesions of the female and male genital tracts

7.Is a painful and profoundly disfiguring disease

A. Lymphatic Filariasis B. Elephantiasis,

C. infection with mosquito-borne D.All

9. Bancroftian filariasis caused by

A. Wucheriria bancrofti B. transmitted by Culex quinquefasciatus

C. Some species of Anopheles D. All

10. Leprosy is a chronic infectious disease caused by

A. Mycobacterium leprae C. disease mainly affects the skin,

B. An acid-fast, rod-shaped bacillus. D. All

Answer sheet

1._____ 2. _____ 3. _____ 4._____ 5._____ 6. _____ 7._____

8._____ 9._____ 10._____

4.1.Plan for health education on identified gaps

Plan sets out: the ways in which you will implement the interventions required to prevent and control the disease. It contains a list of the objectives and corresponding interventions to be carried out, and specifies the responsible bodies who will be involved. It also identifies the time and any equipment needed to implement the interventions. Once you have prepared an action plan you should submit it for discussion with your supervisor and other officials in the woreda Health Office to get their approval.

Then implement the work according to your plan. Now that you have learned the basic concepts and methods relating to communicable diseases in general, it is time for you to move on to consider the diagnosis, treatment, prevention and control of specific diseases. In the next two study sessions, you will learn about the bacterial and viral diseases that can be prevented by vaccination

Plan of health education should include the following components:

- Clear objectives
- Your strategies
- A list of activities that you will do
- Who will help you
- Resources to be used
- Timing
- Indicators.

SELF-CHECK -4	WRITTEN TEST

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

1. **plan of health education** should include the following components: (2point)

   A. Clear objectives B. Resources to be used

   C.A &B D.none

Note: **Satisfactory rating - 2 points** **Unsatisfactory - below 2 points**

You can ask you teacher for the copy of the correct answers.

Answer Sheet

Name: _____ Date: _____

Short Answer Questions

INFORMATION SHEET 5:- DESIGNING STRATEGIES TO RESOLVE HEALTH PROBLEMS

5. Designing strategies to resolve health problems

To function in their roles, public health/community health nurses must use advanced decision-making strategies such as the nursing process, which combines judgment, action, responsibility, and accountability. Public health/community health nurses must take the time to inform themselves about current community health issues and new technologies, so they can properly apply public health science and epidemiological principles to their work.

These are the areas in which public health/community health nurses play key roles:

I. Role in Health Promotion

- ✓ Encourages the adoption of health beliefs, attitudes, and behaviours that contribute to the overall health of the population through public policy, community-based action, public participation, and advocacy or action on environmental and socio-economic determinants of health, as well as health inequities.
- ✓ Supports public policy changes to modify physical and social environments that contribute to risk.
- ✓ Assists communities, families, and individuals to take responsibility for establishing, maintaining, and/or improving their health by adding to their knowledge or control over (and ability to influence) health determinants.
- ✓ Works with others and leads processes to enhance community, group, or individual plans that will help society to plan for, cope with, and manage change.

- ✓ Encourages skill building by communities, families, and individuals so they can learn to balance choices with social responsibility and, in turn, create a healthier future for all.
- ✓ Initiates and participates in health promotion activities in partnership with others such as the community and colleagues in other sectors.

II. Role in Disease and Injury Prevention

- ✓ Reduces the risk of infectious disease outbreaks; this includes early identification, investigation, contact tracing, preventive measures, and activities to promote safe behaviours.
- ✓ Applies epidemiological principles and knowledge of the disease process so as to manage and control communicable diseases using prevention techniques, infection control, behaviour change counseling, outbreak management, surveillance, immunization, episodic care, health education, and case management.
- ✓ Uses appropriate technology for reporting and follow-up.
- ✓ Uses effective strategies to reduce risk factors that may contribute to chronic disease and disability; this may include changes to social and economic environments and inequities that increase the risk of disease.
- ✓ Helps individuals and families to adopt health behaviours that reduce the likelihood of disease, injury, and/or disability.
- ✓ Encourages behaviour changes to improve health outcomes

III Role in Health Protection

- ✓ Acts in partnership with public health colleagues, government, and other agencies to:
  - ensure safe water, air, and food,
  - control infectious diseases, and
  - provide protection from environmental threats (including delegating or carrying out delegated regulatory functions).
- ✓ Takes the lead in identifying issues that may need attention and offers public health advice to groups such as municipal governments or regional districts about the public health impact of policies and regulations.
- ✓ Works with individuals, families, and communities to create or maintain a safe environment where people may live, work, and play

IV. Role in Health Surveillance

- ✓ Is aware of health surveillance data and trends; applies this knowledge to day-to-day work.
- ✓ Integrates eco-social surveillance that focuses on broad, multi-level conditions that contribute to health inequalities.
- ✓ Mobilizes formal and/or informal networks to systematically and routinely collect and report health data for tracking and forecasting health events or health determinants.
- ✓ Collects and stores data within confidential data systems; integrates, analyzes, and interprets this data.
- ✓ Provides expertise to those who develop and/or contribute to surveillance systems, including risk surveillance.

V. Role in Population Health Assessment

- ✓ Uses health surveillance data to launch new services or revise those that exist.
- ✓ Contributes to population health assessments and includes community viewpoints.
- ✓ Plays a key role in producing and using knowledge about the health of communities (or certain populations or aggregates) and the factors that support good health or pose potential risks (determinants of health), to produce better policies and services.

VI. Role in Emergency Preparedness and Response

- ✓ Contributes to and is aware of public health's role in responding to a public health emergency.
- ✓ Plans for, is part of, and evaluates the response to both natural disasters (such as floods, earthquakes, fires, or infectious disease outbreaks) and man-made disasters (such as those involving explosives, chemicals, radioactive substances, or biological threats) to minimize serious illness, death, and social disruption.
- ✓ Communicates details of risk to population subgroups at higher risk and intervenes on their behalf during public health emergencies using a variety of communication channels and engagement techniques.

Care/Counseling

- ✓ Establishes a therapeutic relationship based on trust, respect, caring, and listening.
- ✓ Uses clinical skills to assess the client's ability to participate in joint planning, implementation, and evaluation of nursing interventions.
- ✓ Uses health promotion, illness, and injury prevention techniques that are clientcentred, client-driven, and strengths-based.

- ✓ Helps clients to accept their share of responsibility for health.
- ✓ Sets and maintains boundaries, monitors the counseling relationship, and effectively plans and manages the process until the relationship ends.
- ✓ Remains sensitive to how each client is unique and to the client's vulnerabilities, while placing the focus on enhancing the client's strengths.
- ✓ Promotes client self-care and/or avoidance of harm to self and others.

Case Management

- ✓ Actively engages with individuals, groups, and communities; this may involve case-finding, a process of identifying individuals and/or families who may be at risk and who meet the agency's criteria for case management.
- ✓ Assesses the resources and services that will be needed to build on the client's strengths and skills and thus help the client to attain and/or maintain a desired health status or set of healthy behaviours for improved quality of life.
- ✓ Builds trusting relationships and works with clients to identify and resolve health issues.
- ✓ Develops, implements, and evaluates an agreed-upon plan with the client; the
- ✓ And decisions; it prepares the client for an end to the professional relationship (except when child protection or other welfare concerns apply).
- ✓ Supports individuals and families to build on their strengths and skills so they can find and access available resources and services and thus attain or maintain a desired health status.
- ✓ Links individuals and/or families with needed services and resources.
- ✓ Uses an inter-disciplinary approach and cooperates with other organizations as needed, based on how complex the circumstances are.
- ✓ Coordinates services and applies plans in a logical sequence together with individuals and/or families.

Communication

- ✓ Uses oral and written skills, along with visual, print, and other media to:
  - build trusting, helping relationships,
  - convey health information, including details on risk,
  - assess knowledge, attitudes, beliefs, etc.,
  - help clients find options for making choices that will meet their health needs and/or allow them to speak up for themselves.
- ✓ Negotiates or contracts with health care, social services, or resource agencies, and all segments of the community, to ensure clients have access to services.
- ✓ Uses effective communication with team members.
- ✓ Effectively addresses and manages conflict.
- ✓ Contributes to and plays an active role in health promotion and social marketing that support attitudes and/or beliefs to reduce health inequalities and improve health outcomes.
- ✓ Works to achieve inter-agency and inter-governmental cooperation.
- ✓ Uses effective risk communication approaches.
- ✓ Acts as a spokesperson, as needed, on public health issues.
- ✓ Uses appropriate technology to manage, mitigate, and communicate about public health events; this includes good record keeping

Health Education

- ✓ Assesses the knowledge, attitudes, values, beliefs, behaviours, practices, stage of change, and skills of the learner.

SELF-CHECK -5	*WRITTEN TEST*

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

1. preventing the development of disease /diseases in population by modification of risk factors is:

   A. Tertiary level of prevention B. Secondary level of Prevention

   C. Primary level of prevention D.All

Note: **Satisfactory rating - 2 points** **Unsatisfactory - below 2 points**

You can ask you teacher for the copy of the correct answers.

Answer Sheet

Name: _____ Date: _____

Short Answer Question

1.what is designing of strategies health problem.[point.5]

2.identify the role of health promotion.[point.3]

INFORMATION SHEET 6- IDENTIFYING MOST AT RISK POPULATION(MARPS)

6. Identifying most at risk population(MARPS)

Introduction:-

Understand the special ethical issues of surveillance among MARPs

Public health surveillance for HIV is the systematic and regular collection of information on the occurrence, distribution, and trends in HIV infection. Surveillance data should be as accurate and complete as possible so that it may be analysed for effective prevention and control of the HIV epidemic

Second-generation surveillance refers to activities beyond what are generally a part of routine surveillance, such as case reporting and sentinel sero-surveys. Second-generation surveillance uses additional sources of data to gain a better understanding of the epidemic. It includes biological surveillance of HIV and other sexually transmitted infections (STIs), as well as systematic surveillance of the behaviours that spread infection.

An important part of second-generation surveillance systems is determining HIV prevalence in groups that are at high risk of infection. These groups of people are most at risk for transmitting HIV or contracting HIV. The groups may be defined by the following:

- ✓ the presence or absence of HIV infection
- ✓ the presence of risky behaviours that create transmission events
- ✓ an occupation or socio-economic status that can be associated with risk behaviours

Populations at high risk for HIV transmission

Sometimes referred to as at-risk groups or high-risk groups, members of most-at-risk populations (MARPs) are at increased risk of passing HIV on to others or of contracting HIV. They often are important in establishing, accelerating, or sustaining the HIV epidemic. Therefore, it is essential to understand the effect that HIV has had within these groups.

Throughout the world, sex workers (SWs), injecting drug users (IDUs) and men who have sex with men (MSM) are considered to be populations most at risk. Other MARPS include, but are not limited to, the following:

- ✓ Mobile populations (such as migrants, refugees, and internally displaced persons)
- ✓ Street children
- ✓ Prisoners
- ✓ uniformed personnel.

MARPs are likely to be the first to get HIV infection in a new epidemic. They are infected at higher prevalence rates than the general population. In other words, a population at increased risk will become infected at a faster rate than the general population, which is defined as people who are not members of a sub-population at increased risk.

Table 1.1. Most-at-risk populations discussed in Units 2 through 9.

Sex workers (SWs)

Group	Unit
Sex workers (SWs)	2
injecting drug users (IDUs)	3
Men who have sex with men (MSM)	4
Mobile populations 5 Street children	6
Prisoners	7
Uniformed personnel	8
Out-of-school youth	9

Sexually transmitted infections

In high-risk groups, rates of acute STIs often are used as a proxy for behaviours that could transmit HIV. Persons whose sexual risk is high enough to acquire an STI also may acquire HIV if they are exposed to it. Also, STIs often are more common than HIV, making studies more efficient than HIV prevalence surveys. The STIs can serve as an early warning sign for HIV because they often are present in a population before HIV enters it. In practice, HIV cohort studies are expensive and complicated and measures of HIV incidence are not widely available. Therefore, monitoring and evaluating the success of HIV prevention programmes often relies on incidence and prevalence data on STIs.

Depending on the organism, positive test results can mean either recent infection (indicating recent high-risk sex) or past infection (indicating past high-risk sex). Because some STIs are frequently asymptomatic, their true prevalence cannot be determined by the presence of symptoms alone. For Chlamydia and gonorrhoea, testing is necessary, especially in women.

Testing for STIs, continued

Tests for syphilis, HSV-2, and HBV require blood samples. Antibody tests for chancroid can be done, but are not widely available. Gonorrhoea and Chlamydia can be detected in urine or genital swabs (urethral swabs in men, rarely, and end cervical or vaginal swabs in women). It is easy to collect urine to detect gonorrhoea and Chlamydia, so these infections often are measured in hard-to-reach groups.

High-titre syphilis (a titre of 1:8 or higher) is a very good marker of recent sexual risk-taking. If any of the bacterial infections (syphilis, gonorrhoea or Chlamydia) are detected, there is an ethical obligation to treat the infection. Therefore, studies in which treatable bacterial STIs are measured must treat participants and manage their sexual contacts

Parenterally transmitted infections

- ✓ In areas where there is suspected overlap between SWs and IDUs, you should consider including testing for Parenterally transmitted infections. HCV is the blood-borne infection most typically measured.
- ✓ Presence of HCV can be measured using a variety of laboratory tests, but most often used is a simple enzyme immunoassay (EIA). As with HIV, antibodies for HCV will be present for long periods of time—often decades—in most patients. Although EIAs can detect more than 95% of chronically infected patients, they can detect only 50% to 70% of acute infections. For this reason, a recombinant immunoblot assay (RIBA) often is used as an extra test for HCV.

In addition, it is possible to screen for liver damage—an indirect marker of current or past hepatitis—using liver function tests. The most common of these tests is alanine-leucine transferase (ALT). Less commonly used is aspartate aminotransferase (AST). Note that ALT levels can be elevated in persons with alcoholic damage to the liver, although the damage is seen more prominently using AST levels.

It should be noted that in some countries, the re-use of needles in medical settings and in piercing and scarification practises contribute to parenteral transmission of HCV.

Additionally, in parts of Egypt, the country with the highest prevalence of HCV in the world, the virus is endemic due to the unintended consequences of a governmental effort in the 1970s to combat schistosomiasis using HCV-contaminated needles. In areas where HCV is endemic, such as Egypt's Nile Delta region, the virus probably is not a good indicator for injection drug use.

SELF-CHECK -6	WRITTEN TEST

NAME---------- DATE----------

CHOOSE THE BEST ANSWER.

1. Which one of the following the most common contagious infection viral diseases.

A. hepatitis A B. hepatitis B C. hepatitis C D. hepatitis D

7.1. Levels of prevention

There are different levels of prevention corresponding to the natural history of disease.

Primary prevention: this is protection of healthy people from becoming sick. It is prevention of disease by altering susceptibility or reducing exposure for susceptible individuals.

The objectives are health promotion, prevention of exposure and prevention of disease.

Health promotion: consists of general non specific intervention that enhances health.

The measures taken here aspire/aim to improve socio economic, organizational, behavioral and related factors.

Prevention of exposure: examples provision of safe and adequate water, proper excreta disposal, vector control.

Prevention of disease: takes place between exposure and biological onset. E.g. immunization.

Role of breast feeding**-** prevents exposure and disease, and promotes health and prevents disease.

Secondary prevention: it refers to early detection and prompt treatment of disease.

With such measures, it is possible to cure disease or slow its progression, prevent complications, limit disabilities, and reverse communicability of infectious disease.

On a community basis, early treatment of person with infectious disease (e.g. STI) may protect others from acquiring the infection, thus secondary prevention for the infected individual serves as primary prevention for potential contacts.

Tertiary prevention: takes place after permanent damage has set in. this consists of limitation of disability and rehabilitation where disease has already occurred and left residual damage. In a patient who cannot be cured, tertiary prevention have two aims.

- ✓ Treatment to prevent further disability and death.
- ✓ New training and special education to help the patient to return to some useful work and life in the community.
- ✓ Examples: early physiotherapy to an affected limb to restore motion and prevent contractures, special education/training etc. e.g. leprosy.

Goals and principles of communicable disease control and prevention

Goals

Eradication: reducing the incidence to zero level

Elimination: Reducing the incidence of disease to zero level in specified geographic areas.

Control: reducing the incidence to the level where the disease is no more of public health importance.

Principles

According to the actions targeting the different components of the infectious process.

Action on the reservoir of infection:

Early detection and treatment: this is to stop communicability of the disease process.

Quarantine and isolation:

Isolation refers to the separation of person who have a specific infectious illness from those who are healthy during its period of communicability.

Quarantine refers to the separation and restriction of movement of persons or animals who, while not yet ill, have been exposed to an infectious agent and therefore may become infected.

Interruption of the transmission:

It involves the control of the mode of transmission from the reservoir to a susceptible host. E.g. control of vectors, improvement of personal hygiene and environmental sanitation.

Protection of susceptible host:

At individual level: includes active and passive immunization and chemoprophylaxis.

At the community level: host resistance at the community (population) level is called herd immunity.

Definition: Herd immunity is defined as the resistance of the community to the introduction and spread of infectious agent based on the immunity of high proportion of individuals in the population, thereby lessening the likelihood of a person with a disease coming in to contact with susceptible individuals.

Prerequisite for herd immunity

- Single reservoir(the human host):
- Direct transmission (direct contact or direct projection):

- Total immunity: partially immune hosts may continue to shed the host.
- No shedding of agents by immune hosts (no carrier state).
- Uniform distribution of immunes
- No overcrowding.

  However, these conditions for the operation of herd immunity are seldom fulfilled.

  N.B. mostly a combination of different methods are used to control a specific communicable diseases.

SELF-CHECK -7	WRITTEN TEST

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

1. preventing the development of disease /diseases in population by modification of risk factors is:

   A. Tertiary level of prevention B. Secondary level of Prevention

   C. Primary level of prevention D.All

INFORMATION SHEET 8- FACTORS FOR THE TRANSMISSION OF COMMUNICABLE DISEASES

8.1. Factors involved in the chain of disease transmission

Chain of disease transmission:- represents a series of events, which must occur in order for disease-causing organisms to cause infection.

There are six successive events implicated in the chain of disease transmission.

1. Infectious agent
2. Reservoir
3. Portal of exit
4. Mode of transmission
5. Route of entry
6. Host

Infectious agent (etiology of the specific communicable disease):

1. **Infectivity:** defined as the ability of an agent to cause infection to susceptible host. Can be measured by infection rate.

   Infection rate= $\frac{\text{total number of infected people}}{\text{Total number of susceptible people exposed}} \times 100$
2. **Pathogenicity:** refers to the ability of microorganism to induce disease, thus, it is measured by determining the proportion of infections that result in clinically apparent diseases.

   pathogenicity$= \frac{\text{Total number of } \textbf{clinical} \text{ cases}}{\text{Total number of } \textbf{sub clinical} \text{ cases}}$
3. **Virulence:** the ability to cause severe outcome of the disease.
4. **Resistance:** refers to the ability of the agent to survive adverse environmental conditions during transmission from one to another.

Reservoir of infection

A living (human being, animal, arthropod, or plant) or non- living thing (soil, water gjetc,) in which an infectious agent normally lives, transforms and multiplies, on which it depends primarily for survival and where it reproduces itself in such a way that it can be passed (transmitted) to a susceptible host. A disease can have more than one reservoir.

A. Man as the only reservoir. e.g. measles, gonorrhea, small pox
B. Animal as reservoirs of infection. e.g. anthrax-Cattle, rabies-Dogs
C. Non living things as reservoirs of infection. e.g. clostridium tetany, salmonella typhi of typhoid fever

Portal of exit

This is the site on the reservoir of infection through which the infectious agent escapes from the reservoir.

E.g. GIT: Typhoid fever

Mode of transmission

This is the mechanism by which an infectious agent is transferred from a reservoir of infection to a new host.

There are two main modes of transmission

Direct transmission: this refers to the immediate transfer of infectious agents from an infected host or reservoir to an appropriate portal of entry on the susceptible host. Some of the ways of direct transmission are listed below.

Indirect transmission:

- ✓ Airborne transmission
- ✓ Vehicle borne transmission
- ✓ Vector born

Route of entry

This is the site on the susceptible host through which an infectious agent gets in to the susceptible host.

- ✓ GIT e.g. for typhoid fever
- ✓ Respiratory tract e.g. for TB
- ✓ Skin and mucus membrane e.g. for STI, scabies

Susceptible host

In order for the transmission to be completed the existence of a susceptible host is necessary. A susceptible host is one who is highly likely to acquire infection when exposed to the agent.

Level of susceptibility depends on:

- ❖ Age: infants and elderly at greatest risk
- ❖ Nutritional status
- ❖ Stress
- ❖ Environment
- ❖ Pre-existing medical conditions
- ❖ Immune status

SELF-CHECK -8	WRITTEN TEST

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

1.Successful transmission of the infectious agent requires it to enter the host through a specific part of the body before it can cause disease.(2)

A. Portals Entry C. Portals of Exit

B. Host Susceptibility D.None

Answer Sheet

Name: _____ Date: _____

INFORMATION SHEET 9. - NATURAL HISTORY OF COMMUNICABLE DISEASES

9.1. Natural history of diseases

Def. is the course of the disease over time without/ unaffected by treatment or intervention.

The natural history of disease has four classical stages.

1. **Stage of susceptibility of exposure**:
   - Disease has not develop, but there are factors that favor occurrence
2. **Stage of sub clinical disease (pre symptomatic stage**) – the disease process has already begun, but the disease is not manifest.
3. **Stage of clinical disease:** signs and symptoms of the disease are manifested in this stage.
4. **Stage of disability or death**: the disease has occurred and left over damage to the body that limits the activity of the victim (disability) or has ended with the death of the victim.
   N.B. recovery can take place at any stage in the course of the disease.

Causal concepts of disease

Def. a cause of a disease can be defined as a factor (characteristic, behavior, event, etc) that influences the occurrence of disease.

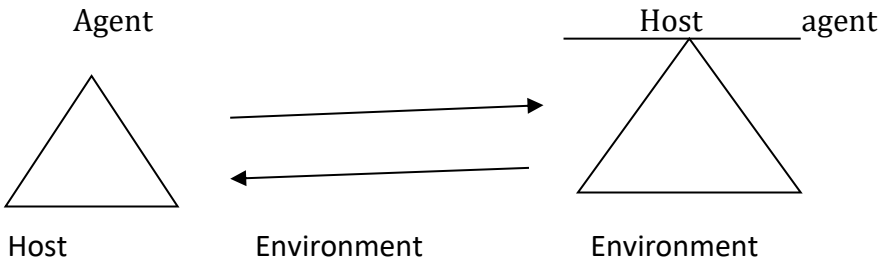
Almost always no one cause acts alone. But different factors act in a concerted /combined manner.

If disease does not develop without the factor being present, than we term the causative factor "necessary".

If the disease always results from the factor, then we term the causative factor "sufficient". It refers to the set of minimal conditions and events that inevitably produce disease example: tuber bacillus is a necessary factor for tuberculosis. Rabies virus is sufficient for developing clinical rabies.

The epidemiologic triad or triangle is the traditional model of infectious disease causation. It has three components: an external agent, a susceptible host and an environment that brings the host and agent together, as shown in the two diagrams below.

Epidemiological triangle and triad (balance beam)



In recognition of the multifactorial nature of most diseases, several other models have been proposed.

Causal pie model is one of the models, which take in to account multiple factors, which are important in causation of disease. In the causal pie model the factors are represented by pieces of the pie called component causes.

Imbalance between the different components in favor of the agent produces infection/ disease

Course of an infectious disease over time

The different periods that are encountered in the course of infectious disease.

Pre-patent period: it is the time interval between infection and the point at which the infection can first be detected, as measured by the first shedding of the agent. **Incubation period**: The time interval between infection and the first clinical manifestation of disease, i.e., between clinical and biological onset.

Communicable period: the period during which an infected host can transmit the infection to others, which can be measured by the length of the time in which the agent is shed by the host.

Generation time: is the period between the onset of infection in a host and the maximal communicability of that host. The maximal communicability may be during or after the incubation period.

Latent period: the time interval between recovery and the occurrence of a relapse or reconsiders recrudescence/recurrence its clinical disease. E.g. typhus fever.

Carriers and their role in communicable disease control

Def. A carrier is an infected person without manifestation of disease but capable of transmitting to others.

There are different types of carriers

1. **Incubatory carrier**: transmits the infection during the incubation period. E.g. measles
2. **Convalescent carrier:** transmits the infection during convalescence- from the time of recovery until the time the agent stops being shed.
   E.g. hepatitis B, typhoid fever
   3. **Asymptomatic carrier:** transmits the infection without ever showing clinical manifestations of the disease.

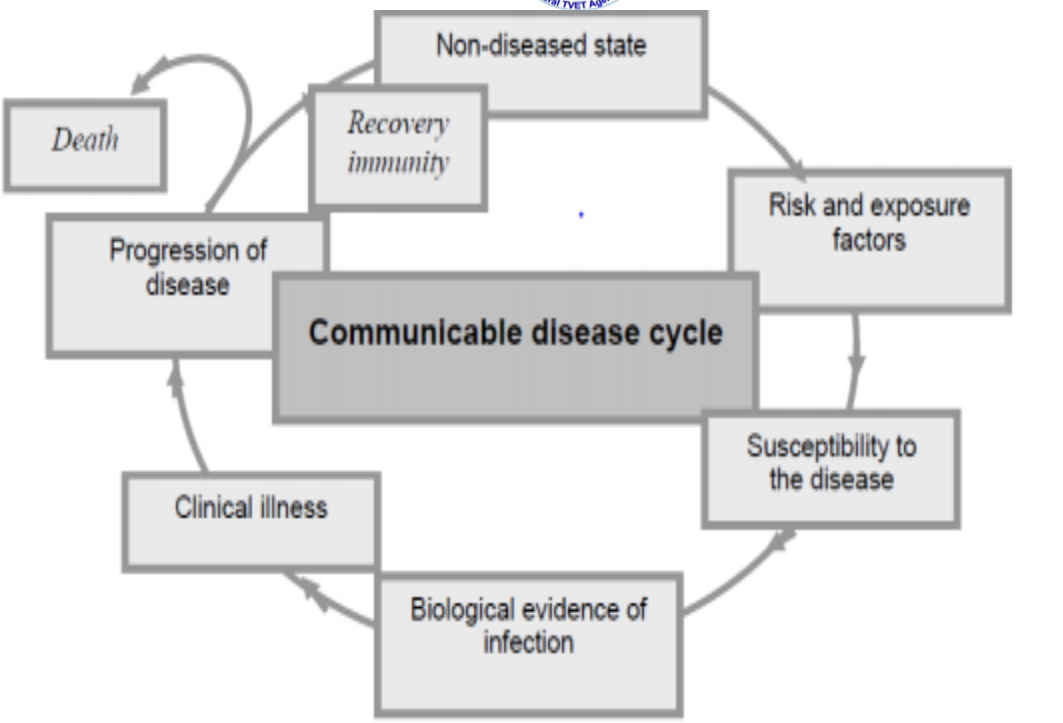
      E.g. poliomyelitis, amebiasis.

4. Chronic carrier: continue to shed the agent for a long period of time.

E.g. hepatitis B, typhoid fever

Epidemiological importance of carriers

- ✓ Number of carriers might occur in large numbers or even outnumber sick patients and serve as a significant reservoir of infection.
- ✓ Difficulty in recognition: cases of disease are relatively easily recognized and can be treated and rendered unimportant in the spread of communicable disease. Iceberg effect/ hippopotamus effect.
- ✓ Mobility: carriers are not restricted to their beds because of their illness.
- ✓ Chronicity: chronic carriers serve as reservoirs for a long period of time.


Non-diseased state
Death
Recovery immunity
Risk and exposure factors
Progression of disease
Communicable disease cycle
Susceptibility to the disease
Clinical illness
Biological evidence of infection

SELF-CHECK -9	WRITTEN TEST

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

1. The time interval between the onset (start) of infection and the first appearance of clinical manifestations of a disease is called(1)

   A. Symptoms C. the incubation period.

   B. Radiation D. all

2. the disease may result in recovery, disability or death of the patient is (1)

   A. Stage of Disability B. Pathogenesis phase

   C. Pre-Pathogenesis Phase D. Stage of susceptibility

Answer Sheet

Name: _____ Date: _____

INFORMATION SHEET10- DEFINING COMMON COMMUNICABLE DISEASES, ETIOLOGY, CLINICAL MANIFESTATIONS AND DIAGNOSTIC APPROACHES

10.1.Epidemic investigation and management

Definitions

Epidemic (out break[3]) is the occurrence of a specific disease **more than or in excess of expected number** in a given area or among a specific group of people over a specified period.

Endemic is the constant presence of a disease or infectious agent with a given geographic area or population group; may also refer to the usual prevalence of a given disease with in such area or group.

Sporadic is a disease that occurs infrequently and irregularly.

Pandemic is an endemic occurring over a very wide area (several countries or continents) and usually affecting a large proportion of the population.

Cluster is an aggregation/accumulation of cases in a given area over a particular period without regard to whether the number of cases is more than expected.

Types of epidemic

1. Common source
   - Point source(one exposure)
   - Continuous (exposure uninterrupted)
2. Propagated (contagious)
   - Serial transfer of infection
3. Mixed epidemic

Common source epidemics: an outbreak caused by exposure of a group of a group of susceptible persons to a common source of pathogenic organisms or chemicals or any other noxious influences, often at the same time or within a brief period. It is characterized by explosiveness of onset and limitation or localization in time, person, and place, which is typical of water and food born diseases. The etiologic agent is transmitted by water, food, air, or inoculation.

Point source epidemic

When the exposure is simultaneous, the resulting cases develop within one incubation

Period. It can result from a single exposure of a population group to the agent. E.g. a food borne epidemic. The epidemic curve is characterized by short duration, sharp rise and fall and being uni-modal.

Common source epidemic with continuous exposure

Resulted from repeated multiple exposure or from continued exposure over a period of time. The epidemic curve is characterized by; long duration, multiple peaks, and several incubation periods.

Propagated or progressive epidemic

Outbreak in which an organism is propagated in the community by passage from person to person or it can involve complex cycle in which the agent must pass through a vector, so that the initial rise in the number of cases is usually gradual. In this type of epidemic, the epidemic extends over a number of incubation periods.

- The epidemic curve may be the same as that of the common source with multiple exposures and with a relatively gentle upslope and somewhat steeper tail.

Mixed epidemic

The epidemic begins with a single common source of infectious agent with subsequent propagative spread. Many food- borne pathogens result in mixed epidemics.

Investigation of epidemic

Objectives of outbreak investigation and management

1. **Anticipation/ prediction**: so that epidemics can be prevented
2. **Preparedness:** so there is readiness to respond systematically
3. **Early detection:** to know when there is a problem
4. **Rapid investigation: to** describe the event and identify interventions
5. **Effective response:** to implement appropriate control measures
6. **Evaluation:** to identify what went right and wrong before and during the outbreak.

Steps of an outbreak/epidemic investigation

1. Prepare for field work
2. Establish the existence of an outbreak
3. Verify the diagnosis
4. Define and identify cases
5. Describe the epidemic by time, place, and person
6. Develop hypotheses
7. Test hypotheses
8. Refine hypotheses and do additional studies
9. Implement control and prevention measures
10. Reporting of the investigation.

SELF-CHECK -10	***WRITTEN TEST***

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

1. During the implementation of a health education activity, the following information should be recorded(2point0

A. The materials used (posters, leaflets, etc.) B. The method used (discussion, drama, etc.)

C .Number of households reached or covered D. All

Note: **Satisfactory rating - 2 points** **Unsatisfactory - below 2 points**

You can ask you teacher for the copy of the correct answers.

Answer Sheet

Name: _____ Date: _____

INFORMATION SHEET 11 . COMMON MYTHS OF COMMON COMMUNICABLE DISEASE IN THE COMMUNITY

11.1. Introduction

The organisms causing the diseases in the air-borne group enter the body via the respiratory tract. When a patient or carrier of pathogens talks, coughs, laughs, or sneezes, he/she discharges fluid droplets. The smallest of these remain up in the air for some time and may be inhaled by a new host. Droplets with a size of 1-5 microns are quite easily drawn in to the lungs and retained thereDroplets that are bigger in size will not remain air-borne for long but will fall to the ground.

Here, however, they dry and mix with dust. When they contain pathogens that are able to survive drying, these may become air-borne again by wind or something stirring up the dust, and they can then be inhaled. Air-borne diseases, obviously, will spread more easily when there is overcrowding, as in overcrowded class rooms, public transport, canteens, dance halls, and cinemas. Good ventilation can do much to counteract the effects of overcrowding. Air-borne diseases are mostly acquired through the respiratory tract.

Common Cold (Acute Viral Rhinitis or Coryza)

Definition

An acutecatarrhal infection of the upper respiratory tract.

Infectious agent Rhino viruses (100 serotypes) are the major causes in adults. Parainfluenza viruses, respiratory syncytial viruses (RSV), Influenza, and Adeno viruses cause common cold-like illnesses in infants and children

Epidemiology Occurrence- Worldwide both in endemic and epidemic forms. Many people have one to six colds per year. Greater incidence in the highlands. Incidence is high in children under 5 years and gradually declines with increasing age.

Reservoir- Humans

Mode of transmission- by direct contact or inhalation of airborne droplets. Indirectly by hands and articles freshly soiled by discharges of nose and throat of an infected person.

Incubation period-between 12 hours and 5 days, usually 48 hours, varying with the agent.

Period of communicability- 24 hours before onset and for 5 days after onset.

Susceptibility and resistance- Susceptibility is universal. Repeated infections (attacks) are most likely due to multiplicity of agents.

Clinical Manifestation

- Coryza, sneezing, lacrimation, pharyngeal or nasal irritation, chills and malaise
- Dry or painful throat.

Diagnosis*f*;- Based on clinical grounds

Treatment

1. No effective treatment but supportive measures like:
    - Bed rest
    - Steam inhalation
    - High fluid intake
    - Anti-pain
    - Balanced diet intake

Prevention and Control

1. Educate the public about the importance of:
    - Hand washing
    - Covering the mouth when coughing and sneezing
    - Sanitary disposal of nasal and oral discharges
2. Avoid crowding in living and sleeping quarters especially in institutions
3. Provide adequate ventilation

4.2 Measles (Rubella)

Definition

An acute highly communicable viral disease

Infectious agent; -Measles virus

Epidemiology Occurrence- Prior to widespread immunization, measles was common in childhood so that more than 90% of people had been infected by age 20; few went through life without any attack.

Reservoir- Humans

Mode of transmission- Airborne by droplet spread, direct contact with nasal or throat secretions of infected persons and less commonly by articles freshly solid with nose and throat secretion. Greater than 94% herd immunity may be needed to interrupt community transmission.

Incubation period-7-18 days from exposure to onset of fever.

Period of communicability- slightly before the prodromal period to four days after the appearance of the rash and minimal after the second day of rash.

Susceptibility and resistance- All those who are non-vaccinated or have not had the disease are susceptible. Permanent immunity is acquired after natural infection or immunization.

Clinical Manifestation

- ✓ Prodromal fever, conjunctivitis, coryza, cough and Koplik spots on the buccal mucosa
- ✓ A characteristic red blotchy rash appears on the third to seventh day, beginning on the face, gradually becoming generalized, lasting 4-7 days.
- ✓ Leucopoenia is common.
- ✓ Complications like otitis media, pneumonia, diarrhea, encephalitis, croup (Laryngo trachea bronchitis) may result from viral replication or bacterial super infection.

Diagnosis

- Based on clinical and epidemiological grounds

Treatment

1. No specific treatment
2. Treatment of complications
3. Vitamin A provision

Nursing care

1. Advise patient to have bed rest.
2. Relief of fever.
3. Provision of non-irritant small frequent diet.
4. Shorten the fingernails.

Prevention and control

1. Educate the public about measles immunization.
2. Immunization of all children (less than 5 years of age) who had contact with infected children.
3. Provision of measles vaccine at nine months of age.
4. Initiate measles vaccination at 6 months of age during epidemic and repeat at 9 months of age.

4.3 Influenza

Definition ;- An acute viral disease of the respiratory tract

Infectious agent;- Three types of influenza virus (A,B and C)

Epidemiology Occurrence- In pandemics, epidemics and localized outbreaks.

Reservoir-Humans are the primary reservoirs for human infection.

Mode of transmission- Airborne spread predominates among crowded populations in closed places such as school buses.

Incubation period- short, usually 1-3 days

Period of communicability-3-5 days from clinical onset in adults; up to 7 days in young children.

Susceptibility and resistance- when a new sub-type appears, all children and adults are equally susceptible. Infection produces immunity to the specific infecting agent.

Clinical Manifestation ;- Fever, head ache, myalgia, prostration, sore throat and cough Cough is often severe and protracted, but other manifestations are self-limited with recovery in 2-7days

Diagnosis; - Based on clinical ground

Treatment

1. Same as common cold, namely:

- Anti-pain and antipyretic
- High fluid intake
- Bed rest
- Balanced diet intake

Prevention and control

1. Educate the public in basic personal hygiene, especially the danger of unprotected coughs and sneezes and hand to mucus membrane transmission.
2. Immunization with available killed virus vaccines may provide 70-80% protection.
3. Amantadine hydrochloride is effective in the chemoprophylaxis of type A virus but not others

4.4 Diphtheria

Definition;- An acute bacterial disease involving primarily tonsils, pharynx, nose, occasionally other mucus membranes or skin and sometimes the conjunctiva or genitalia.

Infectious agent;- Corynebacterium diphtheria

Epidemiology Occurrence-Disease of colder months in temperate zones, involving primarily non-immunized children less than 15 years of age. It is often found among adult population groups whose immunization was neglected. Unapparent, cutaneous and wound diphtheria cases are much more common in the tropics.

Reservoir- Humans

Mode of transmission-contact with a patient of carrier. i.e. with oral or nasal secretions or infected skin.

Incubation period- usually 2-5 days

Period of communicability- variable, until virulent bacilli have disappeared from discharges and lesion; usually 2 weeks or less.

Susceptibility and resistance- Susceptibility is universal. Infants borne to immune mothers are relatively immune, but protection is passive and usually lost before 6 months. Recovery from clinical disease is not always followed by lasting immunity. Immunity is often acquired through unapparent infection. Prolonged active immunity can be induced by diphtheria toxoid.

Clinical Manifestation

- Characteristic lesion marked by a patch or patches of an adherent grayish membrane with a surrounding inflammation (pseudo membrane).
- Throat is moderately sore in pharyngo tonsillar diphtheria, with cervical lymph nodes somewhat enlarged and tender; in severe cases, there is marked swelling and edema of neck.
- Late effects of absorption of toxin appearing after 2-6 weeks, including cranial and peripheral, motor and sensory nerve palsies and myocarditis (which may occur early) and are often severe

Diagnosis *f*

- Based on clinical and epidemiological grounds
- Bacteriologic examination of discharges from lesions.

Treatment

1. Diphtheria antitoxin
2. Erythromycin for 2 weeks but 1 week for cutaneous form or
3. Procaine penicillin for 14 days or single dose of Benzathin penicillin

Primary goal of antibiotic therapy for patients or carriers is to eradicate C. diphtherias and prevent transmission from the patient to susceptible contacts.

Prevention and control

1. Educate the public, and particularly the parents of young children, of the hazards of diphtheria and the necessity for active immunization.
2. Immunization of infants with diphtheria toxoid.

3. Concurrent and terminal disinfection of articles in contact with patient and soiled by discharges of patient.

4. Single dose of penicillin (IM) or 7-10 days course of Erythromycin (PO) is recommended for all persons exposed to diphtheria.

Pertussis (whooping cough)

Definition; - An acute bacterial disease involving the respiratory tract.

Infectious agent;- Bordetella pertussis

Epidemiology Occurrence- An endemic disease common to children especially young children everywhere in the world. A marked decline has occurred in incidence and mortality rates during the past four decades. Outbreaks occur periodically. Endemic in developing world and 90% of attacks occur in children under 6 years of age.

Reservoir- Humans

Mode of transmission- Primarily by direct contact with discharges from respiratory mucus membranes of infected persons by airborne route, probably by droplets. Indirectly by handling objects freshly solid with nasopharyngeal secretions.

Incubation period- 1-3 weeks

Period of communicability- Highly communicable in early catarrhal stage before the paroxysmal cough stage. The most contagious disease with an attack rate of 75-90%. Gradually decreases and becomes negligible in about 3 weeks. When treated with erythromycin, infectiousness is usually 5 days or less after onset of therapy.

Susceptibility and resistance- Susceptibility to non-immunized individuals is universal. One attack usually confers prolonged immunity but may not be lifelong.

Clinical manifestation

The disease has insidious onset and 3 phases:

1. **Catarrhal phase**
   - Lasts 1-2 weeks
   - Cough and rhinorrhea
2. **Paroxysmal phase**
   - Explosive, repetitive and prolonged cough

- Child usually vomits at the end of paroxysm
- Expulsion of clear tenacious mucus often followed by vomiting
- Whoop (inspiratory whoop against closed glottis) between paroxysms.
- Child looks healthy between paroxysms
- Paroxysm of cough interferes with nutrition and cough
- Cyanosis and sub conjunctiva hemorrhage due to violent cough.

3. **Convalescent phase**

- The cough may diminish slowly or may last long time.
- After improvement the disease may recur.

Diagnosis

- Difficult to distinguish it from other URTI
- History and physical examination at phase two (paroxysmal phase) ensure the diagnosis.
- Marked lymphocytosis.

Treatment

1. Erythromycin- to treat the infection in phase one but to decrease transmission in phase two

2. Antibiotics for super infections like pneumonia because of bacterial invasion due to damage to cilia.

Nursing care

1. Proper feeding of the child.

2. Encourage breastfeeding immediately after an attack (each paroxysm).

3. Proper ventilation- continuous well humidified oxygen administration.

4. Reassurance of the mother (care giver),

Prevention and control

1. Educate the public about the dangers of whooping cough and the advantages of initiating immunization at 6 weeks of age.

2. Consider protection of health workers at high risk of exposure by using erythromycin for 14 days.

Pneumococcal pneumonia

Definition;- An acute bacterial infection of the lung tissue and bronchi.

Infectious agent;- Streptococcus pneumonia (pneumococcus)

Epidemiology Occurrence- Endemicparticularly in infancy, old age and persons with underlying medical conditions. Epidemics can occur in institutions, barracks and on board ship where people are living and sleeping in close quarters. Common lower socio-economic groups and developing countries.

Reservoir- Humans - pneumococci are usually found in the URT of healthy people throughout the world.

Mode of transmission- droplet spread, direct oral contact or indirectly through articles freshly soiled with respiratory discharges. Person to person transmission is common.

Incubation period- not well determined, may be as short as 1-3 days.

Period of communicability- Until discharges of mouth and nose no longer contain virulent pneumococci in significant number.

Susceptibility and resistance- Susceptibility is increased by influenza, pulmonary edema of any cause, aspiration following alcohol intoxication, chronic lung disease, exposure to irritants in the air, etc. Malnutrition and low birth weight are important risk factors in infants and young children in developing countries. Immunity following an attack may last for years.

Clinical Manifestation

- Sudden onset of chill, fever, pleural pain, dyspnea, tachypnea, a cough productive of rusty sputum,
- Chest in drawing, shallow and rapid respiration in infants and young children.
- Vomiting and convulsion may occur in infants and young children.

Diagnosis

- Based on clinical grounds
- Chest X-ray- reveals consolidation of the affected lung tissue but not in children.
- Sputum gram stain- reveals gram negative diplococcic

Treatment

1. Antipyretic and antipain

2. Antibiotics like Ampicillin or procaine penicillin for adults but usually crystalline penicillin for children 3. Anticonvulsantsfor infants.

Nursing care

1. Monitor vital signs especially of children.

2. Maintain high body temperature to normal.

3. Intermittent administration of humidified oxygen if indicated especially for young children.

4. Timely administration of ordered medication.

Prevention and control

1. Treatment of cases

2. Treatment of other underlying medical conditions

3. Improved standard of living (adequate and ventilated housing and better nutrition)

4. Avoid overcrowding.

Meningococcal Meningitis

Definition;- An acute bacterial disease that causes inflammation of the pia and arachnoid space.

Infectious agent; - Neisseria meningitides (the meningococcal)

Epidemiology Occurrence- Greatest incidence occurs during winter and spring. Epidemics occur irregularly. Common in children and young adults. It is also common in crowded living conditions.

Reservoir- Humans

Mode of transmission- Direct contact with respiratory droplets from nose and throat of infected person.

Incubation period- 2-10 day, commonly 3-4 days.

Period of communicability-as long as the bacteria is present in the discharge.

Susceptibility and resistance- Susceptibility is low and decreases with age

Clinical Manifestation

- Sudden onset of fever, intense headache, nausea and often vomiting, neck stiffness and frequently, petechial rash with pink macules.
- Kernig's sign may be positive (i.e. patient feels back pain when one of the lower limbs is flexed at the knee joint and extended forward in an elevated position)
- Brudinski's sign may be positive (i.e. when the patient's neck is flexed, the two lower extremities get flexed or raised up).
- Delirium and coma often appear.

Diagnosis

- Based on clinical and epidemiological grounds
- White blood cell count. (neutrophils) *ƒ*
- Cerebrospinal fluid analysis (Gram stain, white cell count, etc.)

Treatment

1. Admit the patient and administer high dose of crystalline penicillin intravenously
2. Antipyretic

Nursing care

1. Maintain fluid balance (input and output)
2. Maintain body temperature to normal
3. Timely administration of antibiotics
4. Monitor vital signs.

Prevention and control

1. Educate the public on the need to reduce direct contact and exposure to droplet infection.
2. Reduce overcrowding in work places, schools, camps, etc.
3. Vaccines containing group A,C and Y strains.
4. Chemotherapy of cases.
5. Chemo prophylaxis (e.g. Rifampin for 2 days)

6. Report to the concerned health authorities.

Tuberculosis

Definition;- A chronic and infectious mycobacterial disease important as a major cause of illness and death in many parts of the world.

Infectious agent.

- Mycobacterium tuberculosis- human tubercle bacilli (commonest cause)
- Mycobacterium bovis- cattle and man infection
- Mycobacterium valium- infection in birds and man

Epidemiology

Occurrence- Worldwide, however underdeveloped areas are more affected. Affects all ages and both sexes. Age groups between 15-45 years are mainly affected. According to the WHO 1995 report, 9 million cases and 3 million deaths have occurred. According to the Ministry of Health report in 1993 E.C, tuberculosis was a leading cause of outpatient morbidity (ranked 8th with 2.2%), leading cause of hospitalization (ranked 3rd with 7.8%) and leading cause of hospital death (ranked 1st with 10.1%).

Tuberculosis has two major clinical forms. Pulmonary (80%) primarily occurs during childhood and secondarily 15-45 years or later. The other is extra pulmonary, which affects all parts of the body. Most common sites are lymph nodes, pleura, Genitourinary tract, bone and joints, meninges and peritoneum.

Mode of transmission- Through aerosolized droplets mainly from persons with active ulcerative lesion of lung expelled during talking, sneezing, singing, or coughing directly. Untreated pulmonary tuberculosis positive (PTB+) cases are the source of infection. Most important is the length of time of contact an individual shares volume of air with an infectious case. That is intimate, prolonged or frequent contact is required. Transmission through contaminated fomites (clothes, personal articles) is rare. Ingestion of unpasteurized

milk transmits bovine tuberculosis. Overcrowding and poor housing conditions favor the disease transmission.

Incubation period- 4-12 weeks

Period of communicability- as far as the bacilli is present in the sputum

Susceptibility and resistance- under 3 years old children, adolescents, young adults, the very old and the immunosuppressed are susceptible. Everyone who is non-infected or non-vaccinated can be infected.

HIV is an important risk factor for the development of HIV- associated tuberculosis by facilitating: Reactivation or Progression of recent infection or Reinfection

Clinical Manifestation

Pulmonary tuberculosis

- Persistent cough for 3 weeks or more
- Productive cough with or without blood-stained sputum
- Shortness of breath and chest pain
- Intermittent fevers, night sweats, loss of weight, loss of appetite, fatigue and malaise.

TB lymph adenitis

- Slowly developing and painless enlargement of lymph nodes followed by matting and drainage of pus.

Tuberculosis pleurisy

- Pain while breathing in, dull lower chest pain, slight cough, breathlessness on exertion.

TB of bones and joints

- Localized pain and/or swelling, discharging of pus, muscle weakness, paralysis and stiffness of joints.

Intestinal TB

- Loss of weight and appetite
- Abdominal pain, diarrhea and constipation
- Mass in the abdomen
- Fluid in the abdominal cavity (ascites)

Tuberculosis meningitis

- Headache, fever, vomiting, neck stiffness and mental confusion of insidious onset.

Diagnosis

1. Clinical manifestations

2. Sputum smears for acid-fast bacilli (AFB), which is the Golden standard. However, one positive result does notjustify starting anti TB treatment since errors can never be excluded.

3. Acid-fast stain for AFB can be done for extra pulmonary tuberculosis having pus-y discharge.

4. Radiological examination: This is unreliable because it can be caused by a variety of conditions or previous TB patients who are healed may have chest x-ray giving the appearance of active TB, which requires treatment.

5. Histopathological examination: Biopsies for extrapulmonary TB (e.g. Tuberculos lymphadenitis)

6. Tuberculin test (mantoux): Helpful in non-BCG vaccinated children under 6 years of age

7. Culture: Complex and sophisticated tool, which takes several weeks to yield results. Not a primary diagnostic tool in our country.

Treatment

The following drugs are being used for treatment of TB in Ethiopia.

- Streptomycin (s) daily IM injection
- Ethambutol (E)
- Rifampin (R)
- Thiacetazone (T)
- Isoniazid (H)
- Pyrazinamide (Z)

All drugs, except streptomycin, which is administered daily through in route) are to be taken orally as a single daily dose preferably on an empty stomach.

Drug regimens (prescribed course of therapy)

1) Short course chemotherapy regimen (DOTS)

- Intensive phase- S(RH)Z for two months
- Continuation phase- TH (EH) for the next 6 months.

2) Long course chemotherapy regimen.

- Intensive phase- S(TH)or S(EH) for 2 months
- Continuation phase-TH or EH for the next 10 months

Nursing care

1. Educate the patient how and when to take the prescribed medication.
2. Tell the patient not to stop the medication unless he/she is told to do so.
3. Tell the patient to come to the health institution if he/she develops drug side effects.
4. Advice the patient on the importance of taking adequate and balanced diet and to eat what is available at home.

Prevention and control

1. Chemotherapy of cases
2. Chemoprophylaxis for contacts
    - INH (Isoniazid) for adults and children who have close contact with the source of infection
3. Immunization of infants with BCG
4. Educate patients with TB about the mode of disease transmission and how to dispose their sputum and cover their mouth while coughing, sneezing, etc.
5. Public health education about the modes of disease transmission and methods of control ƒ Improved standard of living
    - Adequate nutrition
    - Health housing
    - Environmental sanitation
    - Personal hygiene; etc.

INFORMATION SHEET 12- COMPILING, REPORTING AND DOCUMENTING ACTIVITIES

12. Compiling, reporting and documenting activities

Recording and reporting all your health education activities:
is very important, and you must record all your routine health education activities
According to the standard documentation guidelines provided

It is usually considered that an activity which is not recorded has not been done. So, if you fail to document or record the activities you have accomplished, others will not know whether or not the activity has been performed.

Sound and reliable information is the foundation of decision-making across all health system building blocks, and is essential for health system policy development and implementation, governance and regulation, health research, human resources development, health education and training, service delivery and financing.

The health information system provides the underpinnings for decision-making and has four key functions: data generation, compilation, analysis and synthesis, and communication and use. The health information system collects data from the health sector and other relevant sectors, analyses the data and ensures their overall quality, relevance and timeliness, and converts data into information for health-related decision-making.

The health information system is sometimes equated with monitoring and evaluation but this is too reductionist a perspective. In addition to being essential for monitoring and evaluation, the information system also serves broader ends, providing an alert and early warning capability, supporting patient and health facility management, enabling planning, supporting and stimulating research, permitting health situation and trends

analysis, supporting global reporting, and underpinning communication of health challenges to diverse users.

Information is of little vale if it is not available in formats that meet the needs of multiple users − policy-makers, planners, managers, health care providers, communities, individuals. Therefore, dissemination and communication are essential attributes of the health information system.

During the implementation of a health education activity, the following information should be recorded:

- ✓ Number of people who received health education (total, male, females)
- ✓ The topic addressed, and the content of the message
- ✓ The place where the health education activity was delivered
- ✓ The person who delivered the health education session
- ✓ The materials used (posters, leaflets, etc.)
- ✓ The method used (discussion, drama, etc.)
- ✓ Number of households reached or covered
- ✓ Number of health education sessions delivered .
- ✓ Were any problems encountered?

L #5	LO #2- ASSES SCREEN AND MANAGE COMMON COMMUNICABLE DISEASE

Instruction sheet

This learning guide is developed to provide you the necessary information regarding the following content coverage and topics:

- Assessing and screening common communicable diseases
  - ✓ Identify bacterial
  - ✓ Viral
  - ✓ Protozoal
  - ✓ Parasitic
  - ✓ Zoonotic
- Referring Special cases

Learning Instructions:

1 Read the specific objectives of this Learning Guide.

2 Follow the instructions described below.

3 Read the information written in the “Information Sheets”. Try to understand what are being discussed. Ask your trainer for assistance if you have hard time understanding them.

4 Accomplish the “Self-checks” which are placed following all information sheets.

5 Ask from your trainer the key to correction (key answers) or you can request your trainer to correct your work. (You are to get the key answer only after you finished answering the Self-checks).

6 If you earned a satisfactory evaluation proceed to “Operation sheets

7 Perform “the Learning activity performance test” which is placed following “Operation sheets” ,

8 If your performance is satisfactory proceed to the next learning guide,

9 If your performance is unsatisfactory, see your trainer for further instructions or go back to “Operation sheets”.

INFORMATION SHEET-1	ASSESSING AND SCREENING COMMON COMMUNICABLE DISEASES

1. Assessing and screening common communicable diseases

Communicable diseases caused by bacteria, viruses, protozoa, fungi and parasites, make a huge contribution to the burden of disease, disability and death in low- and middle-income countries like Ethiopia.

The emergence of HIV/AIDS as a global pandemic, the resurgence of tuberculosis co-infection with HIV, and the rapid spread of fatal outbreaks of influenza, have also brought communicable diseases back onto the agenda of health services in high-income countries. The six leading groups of infectious diseases (acute respiratory infections, HIV/AIDS, diarrhea diseases, tuberculosis, malaria and measles) together cause over 11 million deaths worldwide every year, and blight the lives of tens of millions more who are living with their chronic or recurrent effects.

These high-profile diseases are relatively well publicized across the world, and are subject to major research into vaccines and treatments. By contrast, at least 1 billion people are affected by the so-called ‘neglected tropical diseases’, including leprosy and schistosomiasis, and/or by intestinal parasites such as tapeworm and hookworm. Some communicable diseases are easily preventable through simple measures such as vaccination and changes in human behaviour (for example, handwashing with soap). However, the transmission of infectious agents will be difficult to reduce to the levels seen in wealthier nations without significant reductions in the proportion of people living in impoverished social circumstances, with poor nutrition that leaves them more vulnerable to infection, without housing that is secure from disease-carrying pests, and without access to clean drinking water, improved sanitation or the safe disposal of household waste. Strenuous efforts are being made to address these problems in Ethiopia, as elsewhere in Africa and in other developing countries.

To prevent or control the major communicable diseases in Ethiopia, a concerted effort by the nation's health workers, the government, development partners and community members is crucial. Together with the practical skills training associated with this Module, Communicable Diseases will help you to acquire the basic skills and knowledge to reduce the burden of mortality and morbidity in your community through the detection, prevention and treatment of common infections.

Communicable Diseases is divided into four Parts. In Part 1 (Study Sessions 1–12), you will first learn the basic concepts in the transmission, prevention and control of communicable diseases, which forms the foundation for all the sessions in later parts of the Module. Next we discuss some important vaccine-preventable diseases (neonatal tetanus, bacterial meningitis, measles, polio and hepatitis B). Part 1 then focuses on malaria and its mosquito vectors: its transmission, its diagnosis based on clinical signs and the malaria rapid diagnostic test (RDT), malaria case management, vector control methods, and the management of epidemics

INFORMATION SHEET 2- BACTERIAL

2.1. Tuberculosis

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Infectious agent.

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5. Public health education about the modes of disease transmission and methods of control ƒ Improved standard of living
    - Adequate nutrition
    - Health housing
    - Environmental sanitation
    - Personal hygiene; etc.

- Active case finding and treatment

Pneumococcal pneumonia

Definition;- An acute bacterial infection of the lung tissue and bronchi.

Infectious agent;- Streptococcus pneumonia (pneumococcus)

Epidemiology Occurrence- Endemicparticularly in infancy, old age and persons with underlying medical conditions. Epidemics can occur in institutions, barracks and on board ship where people are living and sleeping in close quarters. Common lower socio-economic groups and developing countries.

Reservoir- Humans - pneumococci are usually found in the URT of healthy people throughout the world.

Mode of transmission- droplet spread, direct oral contact or indirectly through articles freshly soiled with respiratory discharges. Person to person transmission is common.

Incubation period- not well determined, may be as short as 1-3 days.

Period of communicability- Until discharges of mouth and nose no longer contain virulent pneumococci in significant number.

Susceptibility and resistance- Susceptibility is increased by influenza, pulmonary edema of any cause, aspiration following alcohol intoxication, chronic lung disease, exposure to irritants in the air, etc. Malnutrition and low birth weight are important risk factors in infants and young children in developing countries. Immunity following an attack may last for years.

Clinical Manifestation

- Sudden onset of chill, fever, pleural pain, dyspnea, tachypnea, a cough productive of rusty sputum,
- Chest in drawing, shallow and rapid respiration in infants and young children.
- Vomiting and convulsion may occur in infants and young children.

Diagnosis

- Based on clinical grounds
- Chest X-ray- reveals consolidation of the affected lung tissue but not in children.

- Sputum gram stain- reveals gram negative diplococcic

Treatment

1. Antipyretic and antipain

2. Antibiotics like Ampicillin or procaine penicillin for adults but usually crystalline penicillin for children 3. Anticonvulsantsfor infants.

Nursing care

1. Monitor vital signs especially of children.

2. Maintain high body temperature to normal.

3. Intermittent administration of humidified oxygen if indicated especially for young children.

4. Timely administration of ordered medication.

Prevention and control

1. Treatment of cases

2. Treatment of other underlying medical conditions

3. Improved standard of living (adequate and ventilated housing and better nutrition)

4. Avoid overcrowding.

INFORMATION SHEET 3- VIRAL

3.1. VIRAL HEPATITIS

Introduction

Hepatitis literally means inflammation of the liver. This section focuses on viral hepatitis, infection caused by a group of viruses that primarily affect the liver. Important forms of hepatitis to be discussed include hepatitis A (HAV), hepatitis B (HBV), hepatitis C (HCV). Discussions address each of these infections because although they all cause “hepatitis,” their clinical pictures differ considerably.

Although other hepatitis viruses are gaining more prominence and are present in the Middle East, they are not discussed in detail here. The only one of these viruses that poses a potential threat is hepatitis E, a virus that clinically looks like HAV, causes an acute infection, and is spread by the fecal-oral route (Oldfield et al., 1991; Burans et al., 1994).

Epidemiologic Information

Hepatitis A is usually transmitted by the fecal-oral route. Infectious outbreaks occur where there is exposure to infected water or food (e.g., shellfish, commercial food preparation where an employee does not follow standard food handling guidelines) (Bean et al., 1996). Only in rare circumstances is this infection transmitted through parenteral routes. The Centers for Disease Control and Prevention estimates that between 125,000 and 200,000 infections occur annually in the United States, of which about 70 percent of adults are symptomatic

In rare circumstances (about 100 cases/year), HAV causes a lethal fulminant hepatitis. Serologic testing reveals that about one-third of Americans have evidence of past exposure to the virus. Periodic outbreaks occur. Groups at particularly high risk include

household and sexual contacts of infected individuals, those who travel internationally, particularly to destinations where theinfection is endemic, American Indians, and people in close contact with infected patients, particularly during an outbreak. HAV is endemic in the Middle East, Africa, Asia, and Central and South America where the serologic prevalence of exposure to HAV has been reported to be as high as 96 percent (Oldfield et al., 1991; Heintges and Wand, 1997; el-Hazmi, 1989a)

What Infected Patients Experience

The main clinical features of the three types of viral hepatitis are similar with the most common features being fatigue, abdominal discomfort, jaundice (yellowing of the skin and whites of the eyes), and loss of appetite**.**

Hepatitis A does not develop a chronic state although about 15 percent of patients experience a prolonged or relapsing course. Patients may have intermittent diarrhea and nausea. IgM anti-HAV antibody (indicating acute infection) appears approximately four weeks after exposure and rarely persists longer than six months.

Hepatitis B infections present with similar symptoms usually several weeks following infection. The findings are initially similar to those described for HAV, including a rare patient with fulminant disease who may die acutely from the infection. However, there are between 8,000 and 32,000 new chronic infections per year resulting in between 5,000 and 6,000 deaths annually from liver failure and liver cancer. Patients with chronic hepatitis are at risk for primary liver cancer (hepatocellular carcinoma) .

Hepatitis Chas a similar presentation to the other viruses; however, the risk of chronic infection is much higher with this virus (at least 85 to 90 percent). Consequently, chronic liver disease develops in the majority of patients and the risk of death from chronic liver disease is much higher in these patients .

Diagnosis

Diagnosis of the common hepatitis infections is easily made through laboratory tests. In fact, the availability of these techniques has dramatically reduced the risk of transfusion-transmitted disease because these tests are commonly used to screen all blood donors. There are tests that will diagnose current, chronic, and past hepatitis infections, depending on the patient's condition and the virus involved**.**

Treatment and Prevention

Treatment for HAV is primarily supportive because of its self-limited nature. Treating HBV and HCV infections is also supportive; however, because of the risk of chronic liver disease, including hepatocellular carcinoma and cirrhosis, interferon and other medications are available to retard the development of the long-term complications of chronic disease.

For patients who develop end-stage liver disease, surgical interventions can reduce the morbidity of disease. Liver transplant remains an option for those patients who are refractory to other treatments and who develop life-threatening liver failure. Newer treatments and complementary therapies continue to be developed**.**

Prevention of those hepatitis infections transmitted by the fecal-oral route involves standard hygiene and sanitation techniques. It is important for food handlers to adhere to proper food preparation standards. Immunoglobulin can be given to individuals prophylactically or patients with known recent exposure can receive anti-HA immunoglobulin. Recently, a hepatitis A vaccine became available that reduces the risk of HAV disease.

CRIMEAN-CONGO HEMORRHAGIC FEVER

Crimean-Congo hemorrhagic fever is caused by a virus that is part of the Bunyaviridae family, genus Nair virus. This infection is emerging as an important zoonotic disease (animal disease transmitted to humans). The virus has been identified throughout sub-Saharan Africa, the Middle East, Asia, and Eastern Europe.

The disease is transmitted from the bite of the Hyalomma tick, although nosocomial and household transmission to humans has been observed. Cattle, sheep, and wild hares appear to be the most important animal reservoirs for the virus although Hyalomma are attracted to humans

Epidemiologic Information

The virus has been identified in outbreaks in the Soviet Union, Bulgaria, Pakistan, Iraq, Dubai, Kuwait, and the United Arab Emirates (Gubler and Clark, 1995; Kwiatkowski and Marsh, 1997; Kitua, 1997; Soares and Rodrigues, 1998; Connor et al., 1998; Greenwood, 1997; Facer and Tanner, 1997; Dubois and Pereira da Silva, 1995). The disease is fairly common among some populations in Iraq. Tikriti and colleagues observed that nearly 30 percent of animal breeders tested had antibodies to the virus (Tikriti et al., 1981).

Although a less common route of infection, as indicated, nosocomial infection has been observed in most of the geographic areas in which the virus is endemic. When infection has occurred, there have been high fatality rates. This means that strict blood and body fluid precautions must be taken when infection is even suspected

What Infected Patients Experience

The incubation period for the virus ranges from three to 12 days, followed by sudden onset of severe headaches. Fever, accompanied by shaking chills, is also present initially or shortly thereafter. The fever usually lasts for about a week or slightly longer with about half of those affected experiencing a 12- to 48-hour afebrile period sometime in the middle of the illness.

The fever is frequently accompanied by muscle aches (particularly in the low back and legs), sore throat, and photophobia. Many patients have accompanying nausea and vomiting. Gastrointestinal complaints, in half of infected patients, include diffuse abdominal pain and diarrhea. Patients may also develop

Hepatomegaly (enlarged liver) and right upper quadrant abdominal pain. Facial flushing, possibly involving the upper torso, also occurs. Bradycardia is also observed.

After several days, a petechial rash develops that is associated with epistaxis, hematemesis, and melena (Oldfield et al., 1991), which are manifestations of the ensuing disseminated intravascular coagulation (DIC). The fatality rate for this virus is between 13 and 70 percent, occurring between days six and 14 of the illness (Oldfield et al., 1991; Schwarz et al., 1997**).**

Diagnosis

Laboratory tests and serologic assays are available that specifically identify the virus and detect host response to the virus. More recently, a polymerase chain reaction molecular diagnostic protocol has emerged**.**

Treatment and Prevention

The treatment for infected patients is primarily supportive. However, recent efforts have shown promising results for specific therapies, including ribavirin and specific intravenous immunoglobulin.

Prevention involves reducing exposure to the ticks in endemic areas through the use of pesticides (e.g., DEET) and protective clothing. Individuals should look for and remove ticks on their bodies. In the clinical setting, including the clinical laboratory, methods must be taken to avoid contact with blood and body fluids of potentially infected patients

WEST NILE FEVER

West Nile fever is caused by a virus that is part of the Flaviviridae family. There are nearly 70 different viruses in this group, formerly termed group B arboviruses, of which nearly half are known to cause illness in humans. The World Health Organization defines arboviruses (arthropod-borne viruses) as a group as those "which are maintained in nature principally, or to an important extent, through biological transmission between susceptible vertebrate hosts by hematophagous arthropods; they multiply and produce viremia in the vertebrates, multiply in the tissues of arthropods, and are passed on to new vertebrates by the bites of arthropods after a period of extrinsic incubation" (Sanford, 1991). Common viruses in this classification, in addition to West Nile, include yellow fever, dengue, Japanese encephalitis, St. Louis encephalitis, and tick-borne encephalitis viruses. These viruses are generally spread by mosquitoes or ticks; human-to-human spread does not occur. Infection with these viruses does not produce a unique clinical picture. Therefore, travel to an endemic area and laboratory tests are important for identifying a specific infection.

West Nile virus is a mosquito-borne virus found most commonly in Africa, France, India, Indonesia, the Middle East, and Soviet countries. In 1999, a West-Nile-like virus was identified in patients living in the Northeast United States. The bird is the primary host and the principal vector is Culex univittatus. However, other mosquitoes are known to carry the virus, including Culex pipiens, Culex antennatus, and Culex tritaeniorhynchus (Asia). Other animal reservoirs are not part of the virus's normal life cycle

Epidemiologic Information

West Nile fever is common in the Middle East with most individuals exposed as children. Children experience a nondescript viral illness with fever that is rarely diagnosed. Neighboring Israel also experiences infection although there, it is more likely the young adult than the child who becomes infected. Spread occurs primarily in the summer months when the mosquito population increases.

What Infected Patients Experience

The incubation period for the virus is between one and six days.

After the incubation period, the patient's temperature rises rapidly to between 101oF and 104oF accompanied with nonspecific symptoms associated with fever, including drowsiness, a severe frontal headache, ocular pain, and abdominal and back pain. In addition, patients experience facial flushing, conjunctival injection (red eyes), and coating of the tongue, accompanied by moderate lymph node enlargement (occipital, axillary, inguinal) with some tenderness (Sanford, 1991). About one third of patients experience chills. Half of infected patients experience a rash between one and four days after onset of the illness that lasts from a few hours to until the fever breaks. In most patients, the illness is self-limited, resolving over a few days with lymph node enlargement decreasing over a few months. Rarely are long-term complications observed, and fatalities are extremely rare

Diagnosis

Nonspecific laboratory tests include leukopenia (total white blood cell count less than 4000/µL). Definitive diagnostic tests exist, in the form of viral isolation (during infection) or the identification of a rising specific antibody titer

Treatment and Prevention

For infected patients, the goal is to treat the symptoms. There are no specific treatments for West Nile fever. Prevention involves reducing exposure to the mosquito population in endemic areas

SINDBIS

Sindbis is a vector-borne alpha virus that produces a disease characterized by fever, rash, and polyarthritis. This virus, native to Africa, Scandinavia, former Soviet countries, Australia, and Asia, is part of the Togaviridae family, which includes the more commonly recognized eastern equine encephalitis and western equine encephalitis viruses. The most recognized member of the Togaviridae family is the virus that causes rubella. The virus is a positive-stranded RNA virus

Epidemiologic Information

Sindbis was first described in 1961, during an outbreak of five cases in Uganda). The Sindbis virus exists among birds, transmitted primarily by Culex mosquitoes. A South African study demonstrated the clear association between human disease outbreaks and excessive rainfall, particularly when water stands in usually dry areas. Infection rates may approach 15 percent of the susceptible population in particularly favorable settings. Sindbis shares its vector with that of the West Nile virus. The pattern of this vector is discussed in greater detail in the West Nile virus section above. Because of this common viral vector, in the Middle East it is common to find individuals who are positive for exposure to Sindbis to also be positive for exposure to West Nile virus

What Infected Patients Experience

Sindbis usually presents as a sudden onset of low-grade fever after an incubation period of usually less than one week. Patients experience accompanying myalgias, malaise, and arthralgia that affect the joints and tendons. The joints involved include the wrist (50 percent), fingers (18 percent), hips (26 percent), knee (42 percent), and

ankle (62 percent). Swollen joints do not show significant fluid accumulation. The key feature of Sindbis is the maculopapular nonpruritic (6 percent of patients report itchiness) rash on the trunk and extremities that becomes vesicular, particularly on the extremities. The papules are approximately 3 mm in diameter. The rash is present for an average of one week (range 1 to 21 days). Although the rash and fever are almost always gone after three weeks, arthralgia may persist for many months in some cases Fatal cases of Sindbis have not been reported

Diagnosis

The virus can be isolated from blood or vesicle fluid during the acute phase of the infection. Nonspecific laboratory tests include mild leukopenia and elevation of acute phase reactants. In addition to these nonspecific findings, definitive diagnostic tests exist, particularly the identification of a rising specific antibody titer

Treatment and Prevention

As with other members of this virus group, treatment is supportive and with time (usually a short period but perhaps up to several months), the symptoms resolve. Prevention, as with other arboviruses, centers on decreased exposure to the potentially infective mosquito through the use of repellants and the wearing of clothing that covers the body, particularly when the mosquito population is abundant.

RIFT VALLEY FEVER

Rift Valley fever is an acute, fever-causing viral disease that affects domestic animals (e.g., cattle, buffalo, sheep, goats, and camels) and humans.

Rift Valley fever is most commonly associated with mosquito-borne epidemics during years of heavy rainfall.1 Rift Valley fever virus is a Phlebovirus in the family Bunyaviridae. Other viruses within this family include California encephalitis virus, Crimean-Congo hemorrhagic fever, and Hantavirus.

People get Rift Valley fever from the bites of mosquitoes (Aedes mcintoshi, Culex pipiens, Eretmapodites chrysogaster, Aedes caballus, Aedes circumluteolus, Culex theileri) and possibly other blood-sucking insects that serve as vectors. People can also get the disease if they are exposed to either the blood or other body fluids of infected animals. Therefore, increased risk of infection is seen in farmers, veterinarians, and others who handle infected animals and carcasses. Individuals handling laboratory specimens have also become infected, suggesting an aerosol transmission route**.**

Epidemiologic Information

Rift Valley fever occurs in regions of eastern and southern Africa where sheep and cattle are raised, although the infection is also seen in most countries of sub-Saharan Africa and Madagascar. The virus primarily affects livestock and can cause disease in a large number of domestic animals. The presence of a Rift Valley fever epizootic can lead to an epidemic in people exposed to diseased animals.

Infection is transmitted from generation to generation of mosquitoes through the eggs of infected mosquitoes. It is possible for infected eggs to remain dormant in soil for extended periods of time, only to emerge when moisture returns, as in the case of heavy rains or man-made events that alter environmental moisture**.**

What Infected Patients Experience

Most patients experience a nonspecific febrile reaction. After an incubation period of three to six days, the patient's temperature rises rapidly to 101°F to 104°F. Initial onset of fever may be accompanied by chills, malaise, headache, retro orbital pain, and backache. Some patients may experience nausea andvomiting (Arthur et al., 1993). Later, patients may experience anorexia, epigastric pain, and photophobia. Patients may experience defervescence after two to three days, followed by a second temperature spike before resolution. For most patients, Rift Valley fever is considered a benign, self-limited disease.

Between 1 and 5 percent of individuals develop ocular problems, including retinitis and vacuities that results in some degree of permanent visual loss among about half the affected patients. Rarely (in about 1 percent), at the end of the febrile period, patients develop severe fulminant disease that can include encephalitis, hemorrhage, jaundice, and hepatitis. When such serious manifestations occur, 50 percent or more may die.

Diagnosis

Rift Valley fever can be diagnosed easily through laboratory testing. During the infectious period, the virus can be isolated from blood (in about 75 percent of patients) and by detection of antibodies that are present four to 14 days after onset of disease, coinciding with clinical improvement**.**

Treatment and Prevention

Treatment of patients is symptomatic; there are no specific treatments for Rift Valley fever. Prevention involves avoidance of mosquitoes when traveling to endemic areas and reducing exposure to potentially infected animal products and laboratory specimens

RABIES

Rabies is caused by a number of different viruses within the Rhabdoviridae family and was first recognized more than 4,000 years ago. Although the virus has been classically associated with dogs and dog bites, rabies can affect a large number of wild and domesticated animal species. Because the virus exists in the Gulf region, some individuals raised the question whether rabies might contribute to the illness experienced among Gulf War veterans

Epidemiologic Information

Rabies has been reported on all continents except Australia and Antarctica. Over the last half century, there has been a dramatic decrease in rabies among domestic animals in the United States. This has been accompanied by the consequent decrease in

human cases to fewer than two cases per year in the 1960s and 1970s and less than one case per year during the 1980s. Therefore, the likelihood of exposure to a rabid domestic animal is very low, although many possible exposures occur that constitute the basis for antirabies treatment.

Only about 1,000 rabies deaths are reported to the World Health Organization annually, even though the annual incidence of rabies is believed to be about 30,000 cases. The disease is most common in Southeast Asia, the Philippines, Africa, the Indian subcontinent, and tropical areas of South America.

Rabies among wild animals (especially skunks, raccoons, and bats) has accounted for more than 85 percent of all reported cases of animal rabies every year since 1976 in the United States. Wild animals are now the most important potential source of infection for both humans and domestic animals in the United States. However, in much of the rest of the world, including most of Asia, Africa, and Latin America, the dog remains themajor species with rabies and the major source of rabies among humans (Centers for Disease Control and Prevention, 1991).

Rabies is transmitted to humans only when the virus is introduced through open cuts or wounds in skin or mucous membranes via bites or infected animal saliva. The likelihood of contracting rabies varies with the type of exposures

What Infected Patients Experience

After the incubation period of weeks to many months, the disease initially presents with a nonspecific prodromal phase in from 50 to 80 percent of patients. This period lasts from one to 10 days. Patients experience severe fever, headache, malaise, myalgias, easy fatigability, and cough. Early neurologic involvement may precipitate apprehension, anxiety, agitation, irritability, nervousness, insomnia, psychiatric abnormalities, or depression (Fishbein and Bernard, 1995).

Following the conclusion of the prodromal phase, the patient progresses to the encephalitic or acute neurologic phase. At this stage, which lasts usually from two to seven days, neurologic manifestations are extreme. Almost all patients die from one or more systemic complication of rabies

Diagnosis

At first, the laboratory findings are generally either normal or nonspecific. The specific diagnosis requires either isolation of the virus from infected body fluids or the demonstration of serologic evidence for infection. Clinically, it is difficult to distinguish rabies from other viral infections that produce similar findings**.**

Treatment and Prevention

Because rabies is virtually 100 percent fatal without intervention, prevention is critical. The most important means of prevention is the control of the virus in animal populations, particularly domestic animals. Pre- and post-exposure prophylaxis is also important in preventing the devastating consequences of this disease

DENGUE

Dengue fever is caused by a virus that is part of the Flaviviridae family. There are nearly 70 different viruses in this group, formerly termed group B arboviruses, of which nearly half are known to cause illness in humans. Other common viruses in this classification include yellow fever, West Nile, Japanese encephalitis, St. Louis encephalitis, and tick-borne encephalitis viruses. The most common infection in humans is caused by the dengue virus, of which there are four types. Flaviviruses are generally spread by mosquitoes or ticks; human-to-human spread does not occur. Infection with these viruses does not produce a unique clinical picture. Therefore, travel to an endemic area and laboratory tests are important for identifying specific infection.

Dengue and dengue hemorrhagic fever (DHF) are caused by infection with one of four antigenic ally distinct, virus serotypes (DEN-1, DEN-2, DEN-3, and DEN4). Once

infected with one of these serotypes, the individual develops specific immunity. However, cross-immunity does not develop. It is theoretically possible, therefore, for an individual to be infected four times, each time with a different serotype.

Dengue is mostly seen in tropical urban areas. As with other members of the Flaviviridae family, the virus is transmitted through mosquito bites, specifically Aedes aegypti. This mosquito, a domestic, day-biting mosquito, prefers to feed on humans in some parts of the world (mostly Asia and Oceania) other vectors have been implicated: A. albopictus, A. scutellaris, and A. polynesiensis**.**

Epidemiologic Information

Dengue is the most important mosquito-borne viral disease, affecting humans with a distribution comparable to that of malaria. Approximately 2.5 billion people are living in areas at risk for epidemic transmission (Gubler and Clark, 1995). Tens of millions of cases of dengue fever occur annually along with up to hundreds of thousands of cases of dengue hemorrhagic fever

What Infected Patients Experience

Dengue infection can produce a broad range of clinical findings. Common findings, described during an outbreak in U.S. troops during Operation Restore Hope in Somalia during 1992–1993 include fever (mean temperature on admission in this group was 102oF) (100 percent), chills (93 percent), myalgias (84 percent), headache (86 percent), retro-orbital pain (53 percent), rash (49 percent), pharyngitis (30 percent), cough (28 percent), and conjunctivitis (17 percent) (Sharp et al., 1995).

The incubation period ranges from two to seven days, after which fever appears rapidly, along with the other findings noted above. Joint and bone pain are also prevalent. There is generally a rash during the first few days of illness, followed by anorexia, nausea, vomiting and frequently respiratory manifestations that mimic a cold or flu.

The fever usually breaks after three to six days, followed by a maculopapular or morbilliform rash on the trunk, spreading to the limbs and face and resolving after a few days.

Patients then recover over several weeks although the convalescent period may extend a few more weeks. Dengue does not cause persistent or recurrent musculoskeletal complaints or arthritis

Dengue hemorrhagic fever is the most serious manifestation of the disease. This process, an immunologic reaction, occurs for the most part in individuals already sensitized to the disease, either actively through infection or passively in infants through placental transfer of immunoglobulin from mother to child.

Initially, dengue hemorrhagic fever appears the same as dengue but after several days the patient deteriorates with prostration, restlessness, and signs of circulatory collapse (diaphoresis, cold extremities, dyspnea, circumoral and peripheral cyanosis, and hemorrhagic manifestations). Available laboratory tests cannot identify who will ultimately develop this manifestation

Diagnosis

Because the clinical presentation of dengue is not distinguishable from other infectious diseases, the diagnosis is made by laboratory testing. Laboratory tests available include isolation of the virus, demonstrating the presence of theviral antigen using immunoassay tests, or amplification of the viral nucleic acids using the polymerase chain reaction process. Patient sera can be used to test for the presence of anti-dengue virus antibody; demonstrating a significant increase in the antibody titer between the acute and convalescent sera confirms the infection. This has been an effective way to study exposure of U.S. troops deployed to areas where dengue is endemic.

Treatment and Prevention

Dengue is treated by managing the patient's symptoms, rather than a specific treatment such as an antiviral agent. Patients suspected of infection should ensure that they are safe from additional mosquito bites.

No vaccines currently available protect against dengue, although several are undergoing investigation. The Centers for Disease Control and Prevention predicts that an effective vaccine will be available within the next decade

SANDFLY FEVER

Sandfly fever is also known as Phlebotomus fever, pappataci fever, and threeday fever. The disease is caused by the phleboviruses that are part of the Bunyaviridae family. There are at least five different phleboviruses, distinguished by their immunologic characteristics. Of these five types, two (Sicilian virus and Naples virus) are endemic in the Middle East. Infection with the virus causes a self-limited febrile illness.

During World War II, Sandfly fever was a major problem for U.S. forces, with 19,000 cases reported (Oldfield et al., 1991). The highest incidence was in the Middle East, so military leaders were aware of the risk of Sandfly fever during the Persian Gulf deployment. During World War II, attack rates were 3 to 10 percent of all troops, but among some units, the attack rate exceeded 50 percent. From a military standpoint, Sandfly fever is a serious threat, since a large number of individuals can become infected and ill within a short period of time.

Epidemiologic Information

Sandfly fever is known to occur throughout the Middle East, the Mediterranean area, the Balkans, eastern Africa, and other neighboring areas. Most natives acquire the infection early in life and remain immune. The vector for this infection is the sandfly,

Phlebotomus papatasi. Sandflies are small urban flies that are about 2 to 3 mm in size. Most patients (99 percent) who are bitten by the sandfly are unaware that they were bitten. The sandfly is the same vector responsible for transmitting Leishmania

The sandfly is primarily a nocturnal insect with the largest numbers appearing from April to October. The female fly transmits the disease, starting about a week after she acquires the infection from an infected human host. The fly remains infected throughout life (about four more weeks). The gerbil may be a possible reservoir; however, the infected human is generally considered to be the primary host and source of infection for the sandfly

What Infected Patients Experience

As one of its names implies, the illness associated with sandfly fever is of a short duration, generally on the order of two to four days. The incubation period is from three to six days, followed by a sudden onset of symptoms. Fever is usually the first, peaking sometimes as high as 105oF. Patients may experience severe frontal headaches, retroorbital pain, photophobia, arthralgias, and muscle aches. Nausea, vomiting, abdominal pain, and diarrhea may also occur. Some patients also have symptoms during infection that suggest aseptic meningitis, at times sufficient to warrant evaluation of spinal fluid (Schwarz et al., 1995). After the initial three days, the fever gradually decreases. During convalescence, patients can experience giddiness, weakness, and depression

Diagnosis

The infection can be made based on isolation of the virus starting just before fever onset and continuing for a day after onset. Serologic tests are also available for diagnosis of the infection

Treatment and Prevention

Treatment is generally supportive in nature. Although some advocate ribavirin as a potential treatment, supportive care usually results in resolution of symptoms in a relatively short period of time.

Prevention centers on avoidance of sandfly bites. Spread can be prevented by using insecticides and mosquito nets to protect the infected individual from sustaining another bite, permitting subsequent transmission to an uninfected host. Further information can be found in the review of Leishmania by Oldfield and colleagues**.**

LEISHMANIAVIRUS

Leishmaniavirus is a relatively recently recognized double-stranded RNA virus that infects some strains of Leishmania. This virus is a member of the family Totiviridae, a group of viruses that infect protozoa and fungi Viruses that infect protozoan parasites were first recognized in the 1960s; however, Leishmania-infecting viruses were discovered in 1988 although the molecular characteristics of this group of viruses have recently been elucidated, its relationship to clinical disease is essentially unknown. Leishmaniavirus has some unusual characteristics; specifically, a viral capsid protein is an RNA endonuclease that may be responsible for some of the viral persistence characteristics. The virus has been detected in cultured L. braziliensis, L. guyanensis, and L. major.

Epidemiologic Information

Little is known about this virus. However, in a study of human biopsy tissues collected in 1996 as part of a drug treatment program in Cuzco, Peru, viral RNA was identified in two of 11 samples studied by molecular diagnostic techniques

What Infected Patients Experience

Much more evaluation needs to be completed to understand whether infection of Leishmania with Leishmaniavirus alters the pathogenesis of the protozoa in humans. What clinical manifestations, if any, result from this infection would be speculative**.**

Diagnosis

The diagnosis of infection with Leishmaniavirus in patients who harbor a Leishmania infection is made through the use of molecular diagnostic techniques .However, this diagnostic technique is currently performed only in specialized research laboratories.

Treatment and Prevention

Because this virus is present only in patients infected by Leishmania, the treatment and prevention are the same as those described in the discussion on Leishmania

INFORMATION SHEET 4- *PROTOZOAL*

4.1. Amoebiasis (Amoebic Dysentery)

Definition ;- An infection due to a protozoan parasite that causes intestinal or extra-intestinal disease. Infectious agent Entamoeba histolytic

Epidemiology

Occurrence-worldwide but most common in the tropics and sub-tropics. Prevalent in areas with poor sanitation, in mental institutions and homosexuals. Invasive Amoebiasis is mostly a disease of young people (adults). Rare below 5 years of age, especially below 2 years.

Mode of transmission – Fecal-oral transmission by ingestion of food or water contaminated by feces containing the cyst. Acute amoebic dysentery poses limited danger.

Incubation period- Variable from few days to several months or years; commonly 2-4 weeks.

Period of communicability- During the period of passing cysts of E. histolytica, which may continue for years.

Susceptibility and resistance- Susceptibility is general. Susceptibility to reinfection has been demonstrated but is apparently rare.

Clinical Manifestation

- ✓ Starts with a prodromal episode of diarrhea, abdominal cramps, nausea, vomiting and Tenesmus.
- ✓ With dysentery, feces are generally watery, containing mucus and blood.

Diagnosis

Demonstration ofEntamoeba histolytica cyst or trophozoite in stool.

Treatment

1. Metronidazole or Tinidazole

Prevention and control

1. Adequate treatment of cases
2. Provision of safe drinking water
3. Proper disposal of human excreta (feces) and hand washing following defecation.
4. Cleaning and cooking of local foods (e.g. raw vegetables) to avoid eating food contaminated with feces.

Giardiasis

Definition;- A protozoan infection principally of the upper small intestine associated with symptoms of chronic diarrhea, steatorrheaabdominal cramps, bloating, frequent loose and pale greasy stools, fatigue and weight loss.

Infectious agent'- Giardia lamblia

Epidemiology

Occurrence- Worldwide distribution. Children are more affected than adults. The disease is highly prevalent in areas of poor sanitation.

Reservoir- Humans Mode of transmission- Person to person transmission occurs by hand to mouth transfer of cysts from feces of an infected individual especially in institutions and day care centers.

Period of communicability-Entire period of infection, often months.

Susceptibility and resistance- Asymptomatic carrier rate is high. Infection is frequently self-limited. Persons with AIDS may have more serious and prolonged infection.

Life cycle

TRANSMISSION

1. Cysts ingested in food, water or from hands contaminated with feces

HUMAN HOST

2. Cysts excyst, forming trophozoite
3. Multiply in intestine

4. Trophozoite encysts.

5. Infective cysts passed in feces. * * trophozoite passed in feces disintegrate.

ENVIRONMENT

6. Feces containing infective cysts contaminate the environment.

Clinical Manifestation

- ✓ Ranges fromasymptomatic infection to severe failure to thrive and mal-absorption.
- ✓ Young children usually have diarrhea but abdominal distension and bloating are frequent
- ✓ Adults have abdominal cramps, diarrhea, anorexia, nausea, malaise, bloating, many patients complain of sulphur testing (belching).

Diagnosis

- ✓ Demonstration of Giardia lamblia cyst or trophozoite in feces.

Treatment

1. Metronidazole or Tinidazole

Prevention and control

1. Good personal hygiene, and hand washing before food and following toilet use
2. Sanitary disposal of feces
3. Protection of public water supply from contamination of feces
4. Case treatment
5. Safe water supply

Mosquito-Borne Diseases

Malaria

Definition;- An acute infection of the blood caused by protozoa of the genus plasmodium

Infectious agent.

- ✓ Plasmodium falciparum/malignant tertian: Invades all ages of red blood cells. Red blood cell cycle is 48 hours
- ✓ Plasmodium vivax/benign tertian: Invades reticulocytes only. Red blood cell cycle is 48 hours.
- ✓ Plasmodium ovale/tertian: Invades reticulocytes only. Red blood cell cycle is 48 hours.
- ✓ Plasmodium Malariae/Quartan malaria: Invades reticulocytes only. Red blood cell cycle is 72 hours.

Epidemiology Occurrence- Endemic in tropical and sub-tropical countries of the world. Affects 40% of the world population. Children less 5 years of age, pregnant women and travelers to endemic areas are risk groups. Plasmodium falciparum 60% and vivax 40% are common in Ethiopia.

Predisposing factors are:

- ✓ Environment- physical environment for the propagation
- ✓ Patient source
- ✓ Susceptible recipients
- ✓ Anopheles capable to transmit the parasite
- ✓ Socio-economic factors like immigration, war, poverty, ignorance, agricultural irrigation farms, etc.

Reservoir- Humans

Mode of transmission- By the bite of an infective female anopheles mosquito, which sucks blood for egg maturation. Blood transfusion, hypodermic needles, organ transplantation and mother to fetus transmission is possible. Since there is no pre-erythrocytic (tissue) cycle, the incubation period is short. Anopheles gambae and funestus are common vectors in Ethiopia.

Incubation period- Varies with species

- Plasmodium falciparum 7-14 day's
- Plasmodium vivax 8-14 days

- Plasmodium ovale 8-14 days
- Plasmodium malariae 7-30 days

Period of communicability- Mosquitoes are infective as long as infective gametocytes are present in the blood of patients. Once infected, mosquito remains infective for life.

Susceptibility and resistance- Susceptibility is universal except in some host-resistance factors:

Nonspecific factors

- ✓ Increased splenic clearance reaction
- ✓ Hyperpyrexia- which is said to be schizontcidal
- ✓ Sickle cell traits are resistant to plasmodium falciparum
- ✓ Duffy blood group deficiency (Duffy antigen negative red blood cells) lack receptor for plasmodium vivax.
- ✓ Because of passive immunity infants are resistant in early

Clinical Manifestation

- Chills, rigor, fever, head ache, diarrhea, hallucinations, abdominal pain, aches, renal or respiratory symptoms, jaundice, etc.

Diagnosis

- ✓ Clinical manifestation and epidemiological grounds
- ✓ Blood film for hemoparasite
- ✓ White blood cell count
- ✓ Blood culture to rule out sepsis
- ✓ Chest X-ray to rule out pneumonia.

Treatment

1. Plasmodium vivax, ovale and sensitive plasmodium falciparum
   - Chloroquine or
   - Fansidar
2. Chloroquine resistant falciparum and when sensitivity pattern is not known.
   - Quinine or
   - Fansidar

Nursing care

1. Advise patient to come back if the illness gets severe.
2. Advise on personal protection (bed nets, etc).
3. Reduce fever and maintain comfort.

Prevention and control

1. **Chemoprophylaxis**- for those who go to endemic areas but not for those who live in the endemic area (travelers and newcomers); for under-five children and pregnant mothers who have not enough immunity.

2**. Vector control**

- ✓ Avoiding mosquito breeding sites
- ✓ Residual DDT spray or other chemicals
- ✓ Personal protection against mosquito bites (use of bed nets, etc.)

INFORMATION SHEET 5- PARASITIC

5.1. Hookworm disease

(Ancylostomiasis, Necatoriasis)

Definition ;- A common chronic parasitic infection with a variety of symptoms usually in proportion of the degree of anemia

Infectious agent;- Ancylostoma duodenal and Necator americanus

Epidemiology

Occurrence- Widely endemic in tropical and subtropical countries where sanitary disposal of human feces is not practiced and the soil moisture and temperature conditions favor development of infective larvae.

Reservoir- Humans

Mode of transmission-Through skin penetration by the infective larvae.

Incubation period- Symptoms may develop after a few weeks to many months depending on intensity of infection and iron intake of the host.

Period of communicability- Infected people can contaminate the soil for several years in the absence of treatment.

Susceptibility and resistance- Susceptibility is universal. No evidence that immunity develops with infection

Life cycle

1. Infective filariform larvae penetrate the skin,
2. Larvae migrate. Pass up trachea and are swallowed.
3. Become mature worms in small intestine (attach to wall and suck blood).

4 Eggs produced and passed in feces

5. Eggs develop; Rhabditiform larvae hatch. Feed in soil.
6. Develop into infective filariform larvae in about 1 week.
7. Filariform larvae contaminate soil

Clinical Manifestation

The clinical manifestation is related to:

1. Larval migration of the skin
   - ✓ Produces transient, localized maculopapular rash associated with itching called ground itch.
2. Migration of larva to the lungs.
   - ✓ Produces cough, wheezing and transient pneumonitis.
3. Blood sucking
   - ✓ Light infection-no symptoms
   - ✓ Heavy infection-result in symptoms of peptic ulcer disease like epigastric pain and tenderness. Further loss of blood leads to anemia manifested by exertional dyspnea, weakness and light-headedness.

Diagnosis; -Demonstration of eggs in stool specimen.

Treatment

1. Mebendazole or
2. Albendazole or
3. Levamisole

Prevention and control

1. Sanitary disposal of feces
2. Wearing of shoes
3. Case treatment.

Leishmaniasis

The parasite and its life-cycle: The leishmaniases are a group of diseases caused by over 17 species of the protozoan Leishmania parasite.

Infection is transmitted by the bite of phlebotomies sandflies and results in cutaneous, mucosal or visceral manifestations.

Disease burden: In terms of global disease burden, the leishmaniasis are the third most important vector-borne disease (after malaria and lymphatic filariasis), responsible for an estimated 2.1 million DALYs and 51000 deaths annually (WHO 2004a). These figures are thought to be an underestimate, as only 40 of 88 endemic countries consider leishmaniasis a reportable disease (Croft et al. 2003

Geographical distribution: Much of the disease burden due to the leishmaniases in Africa is concentrated in East Africa. Here, VL or 'kala-azar' is endemic in remote regions of Uganda, Sudan, Ethiopia and Kenya. In this part of the world it is caused by Leishmania donovani.

Clinical features: VL is characterized by fever, hepatosplenomegaly, and cachexia (wasting and weakness). Up to 90% of untreated cases eventually die due to organ failure, anemia or secondary infections**.**

Control options: Classically the diagnosis of VL is confirmed by demonstration of the parasite. IntracellularLeishmania can be identified from aspirates of the spleen, bone marrow, lymph node or liver. Diagnostic yield with this method is highest, but there are contraindications, precautions are necessary and complications, though rare, may be serious . Serological techniques (enzyme-linked immunosorbent assay, direct agglutination test and immunochromatographic strips) have been developed for field use. PCR is still not easily useable in the field

Leishmaniasis and its control

VL is transmitted by the sand-fly vector Phlebotomus martini and transmission is thought to be anthroponotic (humans are the sole reservoir

Human African Trypanosomiasis

HAT, also known as sleeping sickness, is a severe disease that is fatal if left untreated. The parasite and its life cycle**:** HAT is caused by protozoan parasites of the genus Trypanosoma, which is transmitted between infected humans and animals by tsetse

flies (Glossina spp.) and enters the blood stream during blood feeding. Two species of Trypanosoma cause HAT, Trypanosoma brucei rhodesiense and T. b. gambiense**.**

Disease burden: HAT occurs in both epidemic and endemic patterns across more than 200 foci throughout Sub-Saharan Africa. Latest WHO estimates put the number of cases at 300,000 to 500,000, with 100,000 dying every year

The extrapolated estimates are somewhat imprecise, since less than 10% of the population at risk of HAT (about 60 million people) is under surveillance . In terms of DALYs lost, HAT ranks third among parasitic diseases, behind malaria and lymphatic filariasis and ahead of leishmaniasis, schistosomiasis and onchocerciasis

Geographical distribution: T. b. rhodesiense occurs mainly in east and southern Africa, while T.b. gambiense mainly occurs in west and central Africa. Antelopes, hyenas, lions, sheep and cattle can serve as a reservoir for T. b. rhodiense (zoonosis), whereas humans are the only known reservoir for T. b. gambiense. In animals, many other Trypanosoma species are known to cause Trypanosomiasis also called Nagana, next to T. b. rhodiense**.**

Clinical features: Once inside the human host, trypanosomes multiply and invade most tissues. Infection leads to malaise, lassitude and irregular fevers. Early symptoms, including fever and enlarged lymph glands and spleen, are more severe and acute in T.b. rhodesiense infections**.**

Early signs are followed by a range of symptoms including headache, anemia, joint pains, swollen tissues and a primary chancre; advanced symptoms include neurological and endocrine disorders. As the parasites invade the central nervous system, mental deterioration begins, leading to coma and death. T.b rhodesiense infection is usuallyacute, causing severesymptomsand death within a few days or weeks. T.b. gambiense infection tends to progress more slowly (over several years) and is less severe.

Control options: Control of T. b. gambiense involves active case-finding and screening of the population with the card-agglutination test; for T. b. rhodesiense passive case-finding, based on clinical algorithms, is recommended because diagnostic tools are not readily available.

Treatment of infected people has always been difficult and expensive, as few effective drugs are available and it requires specialized administration of drugs and long period of hospital care.

In addition, reduction of tsetse fly numbers can play a significant role, especially against the rhodesiense form of the disease. In the past, this has involved extensive clearance of bush to destroy tsetse fly breeding and resting sites, and widespread application of insecticides. More recently, efficient traps and screens have been developed that can keep tsetse populations at low levels. However, this method has proven difficult to sustain for various reasons, including physical degradation, damage, theft and lack of education in use of the traps.

Soil Transmitted Helminths

The parasite and its life cycle: STHs are also known as common intestinal worms. In terms of public health, three types are important: roundworms (Ascaris lumbricoides), hookworms (Ancylostoma duodenale and Necator americanus), and whipworms (Trichuris trichuria).

A person infected with STH has parasite eggs in their faeces. In areas where there is no latrine system, the soil and water around the community become contaminated with faeces containing worm eggs. In the soil, the eggs mature over 2 to 4 weeks, depending on the type of worm and environmental conditions, and then infect humans by being ingested or by penetrating the skin (hookworms only)

Disease burden: Globally, it is estimated that over a billion people living in the tropics and subtropics are infected with STHs. Although the largest numbers of infections occur

in Asia, the greatest burden of disease occurs in Africa since the morbidity caused by STHs is related to the intensity of infection and host nutrition, and infections are most intense and nutrition woefully inadequate in Africa

Clinical features: The symptoms of infections are non-specific and only become evident when the infection is particularly intense. Non-specific symptoms include nausea, tiredness, and abdominal pain, loss of appetite and, in children, a cough or wheeze.

Chronic and intense STH infections can contribute to malnutrition and iron-deficiency anemia, and also can adversely affect physical and mental growth in childhood.

Control options: Current efforts to control STH infection, as well as schistosomiasis, focus on the school-age population. The cornerstone of control is population-based chemotherapy, especially targeting schoolchildren. School-age children are the natural targets for treatment, and school-based treatment delivery programmes offer major cost advantages because of the use of the existing school infrastructure and the fact that schoolchildren are accessible through schools.

There are four drugs to treat STH infections (see annex 1 for spectrum of anthelminthic activity): Albendazole (ABL) and Mebendazole (MEB) are particularly attractive because they are easy to administer.

Pyrantel pamoate (PYR) and levamisole (LEV) are alternatives for treatment of hookworm and Ascaris infections the former is not effective for treatment of Trichuriasis and they are administered by bodyweight.

As a general strategy, WHO recommends that in areas where STH prevalence is ≥ 50% treatment is provided twice yearly, in areas where prevalence is between 20 – 49% annual treatment is provided and in areas with prevalence < 20% drugs are made available at the health facility.

Schistosomiasis

The parasite and its life cycle: On the African continent human schistosomiasis, a water-borne disease, is caused by three species of blood flukes called schistosomiasis: Schistosoma mansoni causes intestinal schistosomiasis; S. haematobium causes urinaryschistosomiasis; and to alesser extent S. intercalatum which also causes intestinal schistosomiasis**.**

The schistosomes require a molluscan intermediate host in which to undergo development. Freshwater snails from four different genera form an essential component in the life cycle of the four major schistosome species that are responsible for human schistosomiasis.

This ties transmission of the disease to places where people and snails come together at the same water habitat. Hence, schistosomiasis tends to be commonly found in rural communities where contact with freshwater bodies is a routine and inevitable occurrence**.**

Disease burden: Among human parasitic diseases, schistosomiasis, sometimes called bilharzias is, ranks second behind malaria in terms of socio-economic and public health importance in tropical and subtropical areas.

The disease is endemic in 74 developing countries, infecting more than 200 million people in rural agricultural and peri-urban areas. Of these, 20 million suffer severe consequences from the disease and 120 million are symptomatic. In many areas, schistosomiasis infects a large proportion of children under 14 years. An estimated 500-600 million people worldwide are at risk from the disease.

Clinical features: Disease is caused primarily by schistosome eggs, which are deposited by adult worms in the blood vessels surrounding the bladder or intestines, depending on the specific species. S. haematobium causes bladder wall pathology, leading to ulcer formation, hematuria, and dysuria.

Granulomatous changes and ulcers of the bladder wall and ureter can lead to bladder obstruction, secondary urinary tract infections and subsequent bladder calcification, renal failure, lesions of the female and male genital tracts, and hydronephrosis.

The morbidity commonly associated with S. mansoni infection includes lesions of the liver, portal vein, and spleen, leading to perioral fibrosis, portal hypertension, hepatosplenomegaly, and ascites. Schistosomiasis also causes chronic growth faltering and can contribute to anemia

Control options: Schistosomiasis control aims to reduce the amount of disease, rather than to halt transmission entirely. The main strategy for controlling morbidity due to schistosomiasis is based on chemotherapy using praziquantel (PZB). Even though re-infection may occur after treatment, the risk of developing severe organ pathology is diminished and even reversed in young children

Lymphatic Filariasis

LF, more commonly known as elephantiasis, is a painful and profoundly disfiguring disease**.**

The parasite and its life cycle: LF is caused by infection with mosquito-borne, parasitic worm of the genera Wucheriria and Brugia.

Bancroftian filariasis, caused by Wucheriria bancrofti, is mainly transmitted by Culex quinquefasciatus and by some species of Anopheles and Aedes.

Infective larvae are transmitted to humans during blood feeding by infected mosquitoes. The parasites are deposited in the vicinity of the skin puncture wound, from where they penetrate the skin and migrate to the lymphatic vessels.

Over a period of 6 - 12 months, they develop into adult worms that cause damage and dilatation of the lymphatic vessels. The filariae live for several years in the human host. During this period they produce millions of young stages of microfilariae that circulate in

the peripheral blood and are ingested by mosquitoes when these bite infected humans. The larval forms further develop inside the mosquito before becoming infectious to man**.**

Disease burden: LF puts at risk more than a billion people in more than 80 countries. Over 120 million are estimated to be affected by it, of which over 40 million are seriously incapacitated and disfigured. Recent estimates indicate that more than 50 million people in sub-Saharan Africa are affected, accounting for 37% of the global burden.

Clinical features: While LF is usually acquired in childhood, its visible manifestations occur in adults where they lead to temporary and permanent disability. As such, the disease has a major social and economic impact on endemic countries.

LF is now recognized as a major source of morbidity and physical disability and has been ranked by WHO as the second major cause of long-term disability after mental illness (WHO 1999). Filariae lodge in the lymphatic system where they cause inflammation, dilatation and lymphatic system failure.

They are responsible for a variety of clinical manifestations, including lymphedema of the limbs, genital disease (hydrocele, chylocele and swelling of the scrotum and penis) and acute, recurrent secondary bacterial infections known as "acute attacks".

The vast majority of infected people are asymptomatic, but virtually all of them have sub clinical lymphatic damage and as many as 40% have renal involvement.

Control options: The strategy of the Global Programmed to Eliminate Lymphatic Filariasis (PELF) has two components: firstly to interrupt transmission and secondly to alleviate the suffering of affected individuals. To interrupt transmission, endemic districts must be identified and mass drug administration (MDA) be implemented to treat the entire at-risk population.

In most countries this will be based on once-yearly administration of single doses of two drugs given together: ALB plus either Diethylcarbamazin (DEC) or IVN, the latter in areas where either onchocerciasis or loiasis may also be endemic.

This yearly single-dose treatment must be carried out for 4-6 years. To alleviate the suffering caused by the disease, community education is used to raise awareness in affected patients. This promotes the benefits of intensive local hygiene and the possible improvement, both in the damage that has already occurred and in preventing the debilitating and painful acute episodes of inflammation. In addition to MDA, vector control is carried out where this is feasible. The control of Culex is normally based on measures aimed at the prevention of breeding.

Control or elimination of breeding sites in polluted water is possible by improving sanitation systems and hygiene in general. Where such improvements are not possible, the emphasis should be on the prevention of mosquito bites by means of self-protection.

Onchocerciasis

The parasite and its life cycle: Onchocerciasis is an eye and skin disease caused by the worm Onchocerca volvulus. It is transmitted to humans through the bite of blackflies which breed in fast-flowing streams and rivers in the inter-tropical zones.

Living near these breeding sites increases the risk of blindness, hence the commonly known name ‘river blindness.

Disease burden: Onchocerciasis is the world's second leading infectious cause of blindness. Prior to concerted control efforts, about 50% of men over the age of 40 years in some West African communities had been blinded by the disease.

People therefore fled the fertile river valleys to settle in less productive upland country. In the 1970s, the resulting annual economic losses were estimated at US$ 30 million. According to recent estimates, 120 million people are at risk and 18 million are already infected. The disease is responsible for the loss of 1 million DALYs per year.

Clinical features: Inside the human body, the adult female worm (macrofilaria) produces thousands of larvae (microfilariae) that migrate in the skin and the eye. The

death of microfilariae is very toxic to the skin and the eye, producing terrible itching and various eye manifestations (lesions).

After repeated years of exposure, these lesions may lead to irreversible blindness and disfigurative skin diseases sometimes named "leopard" skin and "lizard" skin.

Control options: Because of the dramatic consequences of onchocerciasis in West Africa, WHO in 1974 launched the Onchocerciasis Control Programme (OCP) in collaboration with the World Bank, the United Nations Development Programme (UNDP) and the Food and Agriculture Organization (FAO). Control of the vector by treating the breeding sites with larvicides was the only available approach.

The programme systematically expanded over its first few years to achieve full coverage of several river systems in seven countries. Nonetheless, even this ambitious start was not sufficient and the programme subsequently doubled in size to cover 11 countries. At this point the programme stretched over 1 200 000 Km^2 to protect 30 million people. Vector control was the primary strategy in West Africa, and it was supplemented by drug distribution as of 1989-90. The OCP was officially closed in December 2002 after virtually stopping the transmission of the disease in all participating countries except Sierra Leone where operations were interrupted by a decade-long civil war

Buruli Ulcer

The parasite and its life-cycle: Buruli ulcer is caused by Mycobacterium ulcerans and was named after an area of Uganda that was the site of many cases in the 1960s (Clancey et al., 1962).

The causative organism belongs to the family of bacteria that cause tuberculosis and leprosy. Most patients are women and children who live in rural areas near rivers or wetlands. The exact mode of transmission remains enigmatic however, it has recently been suggested that it may be transmitted by biting water bugs, which means that it

might be classified as a vector-borne disease An alternative mode of transmission may involve penetrating skin injuries during fishing or farming activities that seed the micro-organism into subcutaneous tissues (Meyers et al. 1974

Disease burden: Buruli ulcer is the third most common mycobacterial infection in healthy people after tuberculosis and leprosy and the most poorly understood of these three diseases. In Côte d'Ivoire, approximately 15,000 cases have been recorded since 1978 where up to 16 percent of the population in some villages are affected. In Benin, 4,000 cases have been recorded since 1989; in Ghana (6,000 recorded cases in a national surveyin 1999) up to 22 per cent of villagers are affected in some areas. There is evidence of huge under-reporting of the disease

Clinical features: The disease often starts as a painless swelling in the skin and mainly occurs in the limbs. A nodule develops beneath the skin's surface teeming with mycobacteria. Unlike other mycobacteria, M. ulcerans produces a toxin, which destroys tissue and suppresses the immune system. Massive areas of skin and sometimes bone are destroyed causing gross deformities. When lesions heal, scarring may cause restricted movement of limbs and other permanent disabilities. One important feature of Buruli ulcer is the minimally painful nature of the disease, which may partly explain why those affected do not seek prompt treatment (v. d. Werf et al. 2005)**.**

Control options: Treatment of Buruli ulcer with antibiotics has been unsuccessful to date although the organism is sensitive in-vitro to some of the antibiotics used for treatment of tuberculosis. At present, the only treatment available is surgery to remove the lesion followed by a skin graft if necessary. This is both costly and dangerous, leading to the loss of large amount of tissues/or permanent disability, and it does not prevent recurrence (v. d. Werf et al. 2005). Early detection and surgical removal of small lesions could prevent many complications. BCG (Bacille Calmette-Guérin) vaccination appears to offer some short-term protection from the disease. At the present time, BCG vaccination is the only biomedical intervention that may help control Buruli ulcer in the highly affected areas

INFORMATION 6- SHEET **ZOONOTIC DISEASES**

6. ZOONOTIC DISEASES:

A zoonosis (zoonotic disease or zoonoses -plural) is an infectious disease that is transmitted between species from animals to humans (or from humans to animals).

Zoonotic diseases are difficult to control because the non-human animal acts as a reservoir of infection that can be passed on to humans. Dogs and cows are domestic species, living in large numbers in human settlements where it is very easy for the infection to be transmitted to people. In this study session, you will learn about the causes, modes of transmission, clinical manifestations, and the prevention and control measures against these two zoonotic diseases – rabies and taeniasis.

Examples of zoonotic disease

Rabies is a severe life-threatening viral disease, transmitted to humans in saliva in the bite of infected animals, particularly those in the dog family (canines). Foxes, wolves, hyenas, bats, raccoons and skunks are also a reservoir of rabies virus, but in most countries they rarely transmit the disease. Bats are the main cause of rabies transmission in the USA and Canada.

The infectious agent of rabies is a virus in the *rhabdovirus* family, which attacks the nervous system. If an infected person is not treated very quickly, death is almost inevitable (i.e. rabies has a very high **case-fatality rate**). The WHO estimates that around 55,000 people die from rabies every year, and 24,000 of them are in Africa; 99% of these deaths are the result of a bite from a dog

The transmission of rabies in Ethiopia

Rabies is one of the most severe communicable diseases in Ethiopia, with many cases of the disease diagnosed in many parts of the country. For example, a study in Addis Ababa showed that about 73% of street dogs are infected with rabies virus and more than 2,000 people annually received treatment for rabies after a dog bite. Children are particularly vulnerable to being bitten by dogs, and about 40% of all cases are children under 15 years.

The rabies virus exists in the saliva of the infected animal (as well as in its nervous system) and is transmitted to a person through a bite. Transmission can also be if an infected animal licks a fresh break in the person's skin or mucus membranes, e.g. in the mouth.

The virus travels in the nerves to the brain, where it causes inflammation. Person-to-person transmission is theoretically possible if someone with advanced rabies bites another human, but this is not known to have occurred.

Clinical manifestations and diagnosis of rabies

From the site of the bite, the virus goes to the central nervous system (Figure 38.3) and causes the clinical manifestations which, if untreated, eventually lead to death. Rabies has the highest case-fatality rate of any communicable disease. After an incubation period usually lasting one to three months, but sometimes even up to one year after the bite, the patient develops symptoms that are similar to many other illnesses – fever, headache and general weakness.

The speed of progression is faster if the original site of infection was in an area of the body that is close to the spinal cord or brain, e.g. a bite on the face or hands. As the

disease gets worse, the patient experiences anxiety, confusion, difficulty sleeping, hallucination (seeing things that aren't there), spreading paralysis (inability to move the muscles), difficulty swallowing and convulsions (uncontrollable shaking). A characteristic sign of late-stage rabies in some patients is hydrophobia (fear of water), which manifests in the patient reacting in terror if a bowl of water is brought near. This form of the disease (known as 'furious' rabies) prevents the patient from drinking and speeds the arrival of death within a few days. Other patients become increasingly paralysed and lose consciousness before death

LG #6	LO #3- **ASSES, SCREEN, PROMOTE AND MANAGE COMMON NEGLECTED TROPICAL DISEASES/NTDS**

Instruction sheet

This learning guide is developed to provide you the necessary information regarding the following content coverage and topics:

- Managing common neglected tropical diseases
- Prevention and control of NTDs
- Referring Special cases

Learning Instructions:

10. Read the specific objectives of this Learning Guide.

11. Follow the instructions described below.

12. Read the information written in the “Information Sheets”. Try to understand what are being discussed. Ask your trainer for assistance if you have hard time understanding them.

13. Accomplish the “Self-checks” which are placed following all information sheets.

14. Ask from your trainer the key to correction (key answers) or you can request your trainer to correct your work. (You are to get the key answer only after you finished answering the Self-checks).

15. If you earned a satisfactory evaluation proceed to “Operation sheets

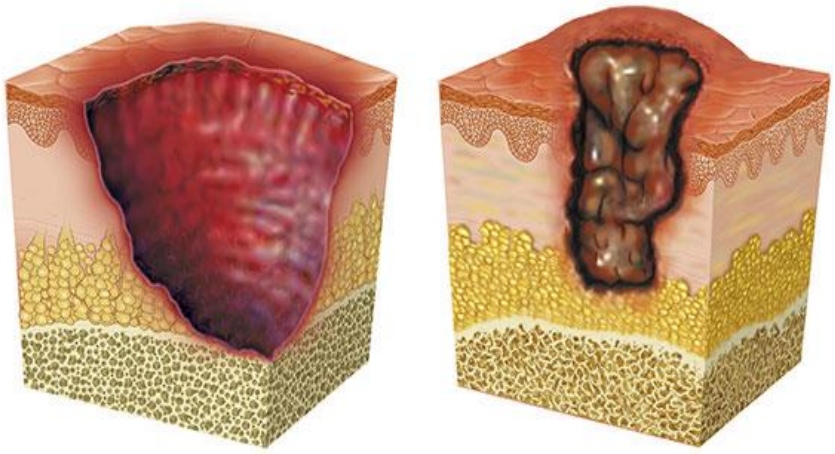
16. Perform “the Learning activity performance test” which is placed following “Operation sheets” ,

17. If your performance is satisfactory proceed to the next learning guide,

18. If your performance is unsatisfactory, see your trainer for further instructions or go back to “Operation sheets”.

Buruli ulcer is a disease caused by the bacterium *Mycobacterium ulcerans*. It mainly affects the skin but can also affect the bone. Cases are generally seen in the tropics, primarily in West Africa and Australia.

Infection often leads to ulcers on the arms or legs, which can also destroy skin or soft tissue. When not properly treated, the disease can cause irreversible deformity or long-term functional disability.



Transmission

How do people get Buruli ulcer?

It is not known how people get Buruli ulcer.

One possibility is that the disease is passed to humans from some insects that are found in water. While no proven link exists between human and animal infection, some animals can get the disease.

For example, laboratory tests from Victoria, Australia, confirmed the disease in several animals, including**:**

- Horses
- Dogs
- Alpacas
- Koalas
- Opossums

Signs and symptoms

The symptoms of Buruli ulcer include:

- ✓ Swelling of the skin
- ✓ Destroyed skin and soft tissue
- ✓ One or more slow growing, generally painless ulcers

If these antibiotics are not given soon after getting sick, the disease can sometimes lead to:

- ✓ Deformity
- ✓ Functional disability (such as limited joint movement)
- ✓ Bone infection
- ✓ Secondary bacterial infection of skin ulcer lesion

Hansen's Disease (Leprosy)

In the United States and in other regions where Chagas disease is now found but is not widespread, control strategies are focused on preventing transmission from blood transfusion, organ transplantation, and mother-to-baby.

Hansen's disease (also known as leprosy) is an infection caused by slow-growing bacteria called *Mycobacterium leprae*. It can affect the nerves, skin, eyes, and lining of the nose (nasal mucosa). With early diagnosis and treatment, the disease can be cured. People with Hansen's disease can continue to work and lead an active life during and after treatment.

Leprosy was once feared as a highly contagious and devastating disease, but now we know it doesn't spread easily and treatment is very effective. However, if left untreated, the nerve damage can result in crippling of hands and feet, paralysis, and blindness

Transmission

How do people get Hansen's disease?

It is not known exactly how Hansen's disease spreads between people. Scientists currently think it may happen when a person with Hansen's disease coughs or sneezes, and a healthy person breathes in the droplets containing the bacteria. Prolonged, close contact with someone with untreated leprosy over many months is needed to catch the disease.

You cannot get leprosy from a casual contact with a person who has Hansen's disease like:

- ✓ Shaking hands or hugging
- ✓ Sitting next to each other on the bus
- ✓ Sitting together at a meal

Hansen's disease is also not passed on from a mother to her unborn baby during pregnancy and it is also not spread through sexual contact.

Due to the slow-growing nature of the bacteria and the long time it takes to develop signs of the disease, it is often very difficult to find the source of infection.

In the southern United States, some armadillos are naturally infected with the bacteria that cause Hansen's disease in people and it may be possible that they can spread it to people. However, the risk is very low and most people who come into contact with armadillos are unlikely to get Hansen's disease.

For general health reasons, avoid contact with armadillos whenever possible. If you had a contact with an armadillo and are worried about getting Hansen's disease, talk to your healthcare provider. Your doctor will follow up with you over time and perform periodic skin examinations to see if you develop the disease. In the unlikely event that you have Hansen's disease, your doctor can help you get treatment.

Who Is at Risk?

In the U.S., Hansen's disease is rare. Around the world, as many as 2 million people are permanently disabled as a result of Hansen's disease.

Overall, the risk of getting Hansen's disease for any adult around the world is very low. That's because more than 95% of all people have natural immunity to the disease.

In the southern United States, some armadillos are naturally infected with the bacteria that cause Hansen's disease.

You may be at risk for the disease if you live in a country where the disease is widespread. Countries that reported more than 1,000 new cases of Hansen's disease to WHO between 2011 and 2015 are:

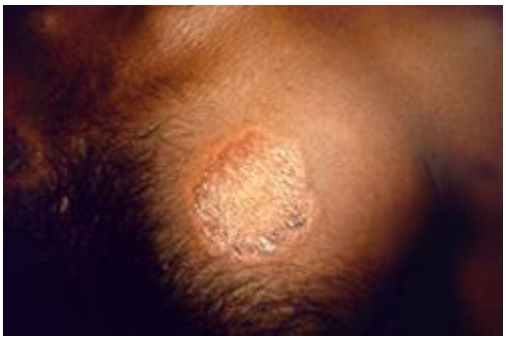
- Africa: Democratic Republic of Congo, Ethiopia, Madagascar, Mozambique, Nigeria, United Republic of Tanzania

- Asia: Bangladesh, India, Indonesia, Myanmar, Nepal, Philippines, Sri Lanka
- Americas: Brazil

Signs and Symptoms

Symptoms mainly affect the skin, nerves, and mucous membranes (the soft, moist areas just inside the body's openings).

The disease can cause skin symptoms such as:



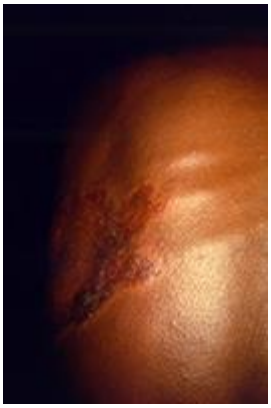
A large, discolored lesion on the chest of a person with Hansen's disease.

- Discolored patches of skin, usually flat, that may be numb and look faded (lighter than the skin around)
- Growths (nodules) on the skin
- Thick, stiff or dry skin
- Painless ulcers on the soles of feet
- Painless swelling or lumps on the face or earlobes
- Loss of eyebrows or eyelashes

Symptoms caused by damage to the nerves are:

- Numbness of affected areas of the skin
- Muscle weakness or paralysis (especially in the hands and feet)
- Enlarged nerves (especially those around the elbow and knee and in the sides of the neck)

- Eye problems that may lead to blindness (when facial nerves are affected)



Enlarged nerves below the skin and dark reddish skin patch overlying the nerves affected by the bacteria on the chest of a patient with Hansen's disease. This skin patch was numb when touched.

Symptoms caused by the disease in the mucous membranes are:

- A stuffy nose
- Nosebleeds

Since Hansen's disease affects the nerves, loss of feeling or sensation can occur. When loss of sensation occurs, injuries such as burns may go unnoticed. Because you may not feel the pain that can warn you of harm to your body, take extra caution to ensure the affected parts of your body are not injured.

If left untreated, the signs of advanced leprosy can include:

- Paralysis and crippling of hands and feet
- Shortening of toes and fingers due to reabsorption
- Chronic non-healing ulcers on the bottoms of the feet
- Blindness
- Loss of eyebrows
- Nose disfigurement

Other complications that may sometimes occur are:

- Painful or tender nerves
- Redness and pain around the affected area
- Burning sensation in the skin

Diagnosis and Treatment

How is the disease diagnosed?

Hansen's disease can be recognized by appearance of patches of skin that may look lighter or darker than the normal skin. Sometimes the affected skin areas may be reddish. Loss of feeling in these skin patches is common. You may not feel a light touch or a prick with a needle.

To confirm the diagnosis, your doctor will take a sample of your skin or nerve (through a skin or nerve biopsy) to look for the bacteria under the microscope and may also do tests to rule out other skin diseases.

How is the disease treated?

Hansen's disease is treated with a combination of antibiotics. Typically, 2 or 3 antibiotics are used at the same time. These are dapsone with rifampicin, and clofazimine is added for some types of the disease. This is called multidrug therapy. This strategy helps prevent the development of antibiotic resistance by the bacteria, which may otherwise occur due to length of the treatment.

Treatment usually lasts between one to two years. The illness can be cured if treatment is completed as prescribed.

If you are treated for Hansen's disease, it's important to:

Tell your doctor if you experience numbness or a loss of feeling in certain parts of the body or in patches on the skin. This may be caused by nerve damage from the

infection. If you have numbness and loss of feeling, take extra care to prevent injuries that may occur, like burns and cuts.

Take the antibiotics until your doctor says your treatment is complete. If you stop earlier, the bacteria may start growing again and you may get sick again.

Tell your doctor if the affected skin patches become red and painful, nerves become painful or swollen, or you develop a fever as these may be complications of Hansen's disease that may require more intensive treatment with medicines that can reduce inflammation.

If left untreated, the nerve damage can result in paralysis and crippling of hands and feet. In very advanced cases, the person may have multiple injuries due to lack of sensation, and eventually the body may reabsorb the affected digits over time, resulting in the apparent loss of toes and fingers. Corneal ulcers or blindness can also occur if facial nerves are affected, due to loss of sensation of the cornea (outside) of the eye. Other signs of advanced leprosy may include loss of eyebrows and saddle-nose deformity resulting from damage to the nasal septum.

Antibiotics used during the treatment will kill the bacteria that cause leprosy. But while the treatment can cure the disease and prevent it from getting worse, it does not reverse nerve damage or physical disfiguration that may have occurred before the diagnosis. Thus, it is very important that the disease be diagnosed as early as possible, before any permanent nerve damage occurs

Chromoblastomycosis

The disease

Chromoblastomycosis is a chronic infection of cutaneous and subcutaneous tissues. Lesions are clinically polymorphic, the most frequent are nodular, verrucous and tumoral. Many different species of fungi are associated with this infection but the three most common species
are: *Fonsecaeapedrosoi*, *Cladophialophoracarrionii* and *Phialophoraverrucosa*.

The disease was first described in Brazil by Dr Max Rudolph, a German physician in 1914.

Epidemiology

The causative fungi have worldwide distribution, but chromoblastomycosis is most common in tropical areas. The black moulds are distributed in the soil, and associated with plants, especially palm trees and cacti. Patients become infected when injuries break the skin and allow the fungus to enter the body.

The highest prevalence of the disease is found in the Amazon region of Brazil, the northern part of Venezuela, and in Madagascar. The infection occurs most frequently in males and is not transmitted from human to human.

Clinical picture

After infection, a small elevated lesion develops. This is followed by a slow proliferation of tissue that produces crusted, verrucous or ulcerated lesions. If the infection is not treated, the lesions continue to grow and eventually resemble a tumour or a cauliflower.

Diagnosis

The fungi can be identified in skin scrapings or by biopsy. The fungi can also be detected by microscopic examination or cultured in the laboratory. If infection is present, microscopic examination reveals characteristic muriform cells. These large cells are

round, chestnut shape, brown and with specific patterns. When the fungus is cultured, it can be identified using several different methods, but the best is DNA sequencing. Antibody testing is not useful in diagnosing this infection.

Surveillance and control

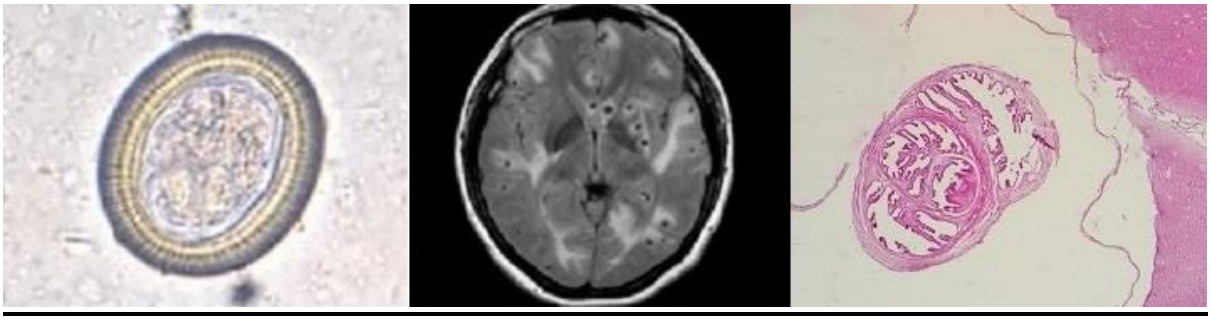
Accurate data on the incidence and prevalence are not available. For the purposes of surveillance, the disease is defined as: “a chronic (>3 months) cutaneous and subcutaneous fungal infection manifesting with verrucous, nodular and plaque lesions, depicting muriform fungal cells on microscopy.”

Chromoblastomycosis is considered an occupational disease, occurring among farm labourers, babassu coconut harvesters, lumberjacks, or vendors of farm products. Lack of protective shoes, gloves or garments and poor nutrition and hygienic habits are risk factors associated with chromoblastomycosis. Prevention is difficult, but it is useful to advise people not to walk barefoot in areas where infection has been detected.

Treatment

Treatment should begin as soon as possible. Results are poor in patients who have had lesions for a long time. In the first phase, surgery may be the best approach. Treatment with antifungal medicines is indicated for large lesions that cannot be treated surgically. Itraconazole, voriconazole and posaconazole have been used successfully. For cases that do not respond to antifungal monotherapy, the combination of itraconazole plus terbinafine may be considered.

Parasites - Cysticercosis



Images: Left: *Taenia* egg at a high magnification of 400x. When consumed by humans, *Taeniasolium* eggs can lead to cysticercosis, including a serious condition known as neurocysticercosis. Center: A radiographic image of the brain of a patient who has neurocysticercosis; the small dark spots within the brain are larval cysts of *T. solium*. Right: A cross-section through a *T. solium* cyst from a human brain tissue specimen, stained with hematoxylin and eosin (H&E). (Credit (L to R): Westchester Medical Center, PHIL, DPDx.)

Cysticercosis is a parasitic tissue infection caused by larval cysts of the tapeworm *Taeniasolium*. These larval cysts infect brain, muscle, or other tissue, and are a major cause of adult onset seizures in most low-income countries. A person gets cysticercosis by swallowing eggs found in the feces of a person who has an intestinal tapeworm. People living in the same household with someone who has a tapeworm have a much higher risk of getting cysticercosis than people who don't.

People do not get cysticercosis by eating undercooked pork. Eating undercooked pork can result in intestinal tapeworm if the pork contains larval cysts. Pigs become infected by eating tapeworm eggs in the feces of a human infected with a tapeworm.

Both the tapeworm infection, also known as taeniasis, and cysticercosis occur globally. The highest rates of infection are found in areas of Latin America, Asia, and Africa that

have poor sanitation and free-ranging pigs that have access to human feces. Although uncommon, cysticercosis can occur in people who have never traveled outside of the United States. For example, a person infected with a tapeworm who does not wash his or her hands might accidentally contaminate food with tapeworm eggs while preparing it for others

Epidemiology & Risk Factors

Español (Spanish)

Cysticercosis is an infection caused by the larvae of the tapeworm, *Taeniasolium*. A person with an adult tapeworm, which lives in the person's gut, sheds eggs in the stool. The infection with the adult tapeworm is called taeniasis. A pig then eats the eggs in the stool. The eggs develop into larvae inside the pig and form cysts (called cysticerci) in the pig's muscles or other tissues. The infection with the cysts is called cysticercosis. Humans who eat undercooked or raw infected pork swallow the cysts in the meat. The larvae then come out of their cysts in the human gut and develop into adult tapeworms, completing the cycle.

People get cysticercosis when they swallow eggs that are excreted in the stool of people with the adult tapeworm. This may happen when people

- Drink water or eat food contaminated with tapeworm eggs
- Put contaminated fingers in their mouth

Cysticercosis is not spread by eating undercooked meat. However, people get infected with tapeworms (taeniasis) by eating undercooked infected pork. People who have tapeworm infections can infect themselves with the eggs and develop cysticercosis (this is called autoinfection). They can also infect other people if they have poor hygiene and contaminate food or water that other people swallow. People who live with someone who has a tapeworm infection in their intestines have a much higher risk of getting cysticercosis than other people.

Human cysticercosis is found worldwide, especially in areas where pig cysticercosis is common. Both taeniasis and cysticercosis are most often found in rural areas of developing countries with poor sanitation, where pigs roam freely and eat human feces. Taeniasis and cysticercosis are rare among persons who live in countries where pigs are not raised and in countries where pigs do not have contact with human feces. Although uncommon, cysticercosis can occur in people who have never traveled outside of the United States if they are exposed to tapeworm eggs

Diagnosis

Español (Spanish)

If you think that you may have cysticercosis, please see your health care provider. Your health care provider will ask you about your symptoms, where you have travelled, and what kinds of foods you eat. The diagnosis of neurocysticercosis usually requires MRI or CT brain scans. Blood tests may be useful to help diagnose an infection, but they may not always be positive in light infections.

If you have been diagnosed with cysticercosis, you and your family members should be tested for intestinal tapeworm infection. See the taeniasis section for more information on intestinal tapeworm infections.

Treatment

Some people with cysticercosis do not need to be treated. There are medications available to treat cysticercosis for those who do need treatment. Sometimes surgery may be needed. Your doctor will advise you on which treatment is best for you.

More on: Resources for Health Professionals: Treatment

Prevention & Control

To prevent cysticercosis, the following precautions should be taken:

- Wash your hands with soap and warm water after using the toilet, changing diapers, and before handling food
- Teach children the importance of washing hands to prevent infection
- Wash and peel all raw vegetables and fruits before eating
- Use good food and water safety practices while traveling in developing countries such as:
- Drink only bottled or boiled (1 minute) water or carbonated (bubbly) drinks in cans or bottles
- Filter unsafe water through an “absolute 1 micron or less” filter AND dissolve iodine tablets in the filtered water; “absolute 1 micron” filters can be found in camping and outdoor supply stores

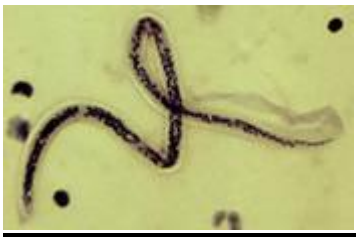
Parasites - Lymphatic Filariasis

Lymphatic filariasis, considered globally as a neglected tropical disease (NTD), is a parasitic disease caused by microscopic, thread-like worms. The adult worms only live in the human lymph system. The lymph system maintains the body’s fluid balance and fights infections.

Lymphatic filariasis is spread from person to person by mosquitoes.

People with the disease can suffer from lymphedema and elephantiasis and in men, swelling of the scrotum, called hydrocele. Lymphatic filariasis is a leading cause of permanent disability worldwide. Communities frequently shun and reject women and men disfigured by the disease. Affected people frequently are unable to work because of their disability, and this harms their families and their communities.

Epidemiology & Risk Factors



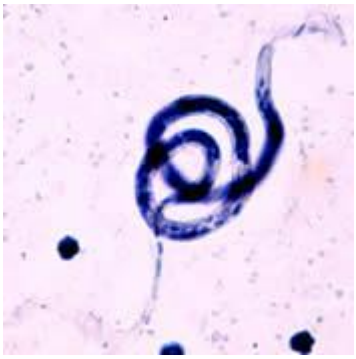
Microfilaria of *Wuchereria bancrofti* (CDC Photo; DPDx)

There are three different filarial species that can cause lymphatic filariasis in humans. Most of the infections worldwide are caused by *Wuchereria bancrofti*. In Asia, the disease can also be caused by *Brugia malayi* and *Brugia timori*.

The infection spreads from person to person by mosquito bites. The adult worm lives in the human lymph vessels, mates, and produces millions of microscopic worms, also known as microfilariae. Microfilariae circulate in the person's blood and infect the mosquito when it bites a person who is infected. Microfilariae grow and develop in the mosquito. When the mosquito bites another person, the larval worms pass from the mosquito into the human skin, and travel to the lymph vessels.

They grow into adult worms, a process that takes 6 months or more. An adult worm lives for about 5–7 years. The adult worms mate and release millions of microfilariae

into the blood. People with microfilariae in their blood can serve as a source of infection to others.



Microfilaria of *Brugia malayi* (CDC Photo; DPDx)

A wide range of mosquitoes can transmit the parasite, depending on the geographic area. In Africa, the most common vector is *Anopheles* and in the Americas, it is *Culex quinquefasciatus*. *Aedes* and *Mansonia* can transmit the infection in the Pacific and in Asia.

Many mosquito bites over several months to years are needed to get lymphatic filariasis. People living for a long time in tropical or sub-tropical areas where the disease is common are at the greatest risk for infection. Short-term tourists have a very low risk.

Programs to eliminate lymphatic filariasis are under way in more than 66 countries. These programs are reducing transmission of the filarial parasites and decreasing the risk of infection for people living in or visiting these communities

Diagnosis

The standard method for diagnosing active infection is the identification of microfilariae in a blood smear by microscopic examination. The microfilariae that cause lymphatic filariasis circulate in the blood at night (called nocturnal periodicity). Blood collection should be done at night to coincide with the appearance of the microfilariae, and a thick

smear should be made and stained with Giemsa or hematoxylin and eosin. For increased sensitivity, concentration techniques can be used.

Serologic techniques provide an alternative to microscopic detection of microfilariae for the diagnosis of lymphatic filariasis. Patients with active filarial infection typically have elevated levels of antifilarial IgG4 in the blood and these can be detected using routine assays.

Because lymphedema may develop many years after infection, lab tests are most likely to be negative with these patient

Treatment

Patients currently infected with the parasite

Diethylcarbamazine (DEC) is the drug of choice in the United States. The drug kills the microfilariae and some of the adult worms. DEC has been used world-wide for more than 50 years. Because this infection is rare in the U.S., the drug is no longer approved by the Food and Drug Administration (FDA) and cannot be sold in the U.S.

Physicians can obtain the medication from CDC after confirmed positive lab results. CDC gives the physicians the choice between 1 or 12-day treatment of DEC (6 mg/kg/day). One day treatment is generally as effective as the 12-day regimen.

DEC is generally well tolerated. Side effects are in general limited and depend on the number of microfilariae in the blood. The most common side effects are dizziness, nausea, fever, headache, or pain in muscles or joints.

DEC should not be administered to patients who may also have onchocerciasis as DEC can worsen onchocercal eye disease. In patients with loiasis, DEC can cause serious adverse reactions, including encephalopathy and death. The risk and severity of the adverse reactions are related to *Loa loa* microfilarial density.

In settings where onchoceriasis is present, Ivermectin is the drug of choice to treat LF.

Some studies have shown adult worm killing with treatment with doxycycline (200mg/day for 4–6 weeks).

Patients with clinical symptoms

People with lymphedema and elephantiasis are unlikely to benefit from DEC treatment because most people with lymphedema are not actively infected with the filarial parasite.

To prevent lymphedema from getting worse, patients should ask their physician for a referral to a lymphedema therapist so they can be informed about some basic principles of care such as hygiene, elevation, exercises,skin and wound care, and wearing appropriate shoes.

Patients with hydrocele may have evidence of active infection, but typically do not improve clinically following treatment with DEC. The treatment for hydrocele is surgery.

There is some evidence that suggests that a course of the antibiotic doxycycline may prevent lymphedema from getting worse.

Prevention & Control

The best way to prevent lymphatic filariasis is to avoid mosquito bites. The mosquitoes that carry the microscopic worms usually bite between the hours of dusk and dawn . If you live in an area with lymphatic filariasis:

- At night
  - Sleep in an air-conditioned room or
  - Sleep under a mosquito net
- Between dusk and dawn
  - Wear long sleeves and trousers and
  - Use mosquito repellent on exposed skin.

Another approach to prevention includes giving entire communities medicine that kills the microscopic worms — and controlling mosquitoes. Annual mass treatment reduces the level of microfilariae in the blood and thus, diminishes transmission of infection. This is the basis of the Global Programme to Eliminate Lymphatic Filariasis.

Experts consider that lymphatic filariasis, a neglected tropical disease (NTD), can be eliminated globally and a global campaign to eliminate lymphatic filariasis as a public health problem is under way. The elimination strategy is based on annual treatment of whole communities with combinations of drugs that kill the microfilariae.

As a result of the generous contributions of these drugs by the companies that make them, hundreds of millions of people are being treated each year . Since these drugs also reduce levels of infection with intestinal worms, benefits of treatment extend beyond lymphatic filariasis. Successful campaigns to eliminate lymphatic filariasis have taken place in China and other countries

Mycetoma

Mycetoma is a disease caused by certain types of bacteria and fungi found in soil and water. These bacteria and fungi may enter the body through a break in the skin, often on the person's foot. The resulting infection causes firm, usually painless but debilitating masses under the skin that can eventually affect the underlying bone.

Mycetoma can be caused by bacteria (actinomycetoma) or fungi (eumycetoma). The number of people with mycetoma worldwide is not known, but there were 8,763 cases reported in a 2013 review of scientific articles between 1950 and 2013. The actual number of cases is likely substantially higher

Mycetoma affects people of all ages and is more common in men. This disease primarily affects poorer people in rural regions of Africa, Latin America, and Asia that are located near Earth's equator and have dry climates. Mycetoma has rarely been

reported in the United States in recent decades. A review of the literature from 1890 to 2014 showed fewer than 80 cases occurring in the US.

Travelers from the United States to areas where mycetoma has been reported are at low risk of getting mycetoma. This is because developing mycetoma requires repeatedly exposing broken skin to soil and water that contain the microbes that cause mycetoma,

Diagnosis requires laboratory evaluation of a biopsy, or small tissue sample, of the infected area. The treatment for mycetoma includes antibiotics or antifungal medication, depending on which type of microbe is causing it, and surgery is sometimes needed to cut away the infected tissue. Wearing shoes might help prevent mycetoma.

Symptoms

Symptoms are similar for bacterial and fungal mycetoma. Both appear as firm, painless masses under the skin. These masses usually appear on a person's foot but can form anywhere on the body.

The mycetoma masses start small, but over time they can grow larger, develop oozing sores, and cause the affected limb to become deformed or unusable. If mycetoma is not treated or if treatment fails, it can spread to other areas of the body. Long-term mycetoma can eventually destroy the underlying muscle and bone

Risk & Prevention

Mycetoma is a health problem in equatorial regions of Africa, Latin America, and Asia known as the "mycetoma belt." Fungal mycetoma (eumycetoma) is the most common type in Africa, while bacterial mycetoma (actinomycetoma) causes most cases in South and Central America and some Asian countries.

- Mycetoma affects people of all ages and is more common in men. Many people with mycetoma work in agricultural jobs, such as farmers and livestock herders.

Mycetoma has rarely been reported in the United States in recent decades. A review of the literature (1890–2014) showed fewer than 80 cases occurring in the
Health care providers and researchers believe that wearing shoes might prevent injuries that cause mycetoma because they protect the feet while walking or working outside in areas where the germs that cause mycetoma are common in water and soil. Early detection and treatment, before symptoms cause serious effects, can reduce disabilities from mycetoma and may cure the condition

Transmission

The bacteria and fungi that cause mycetoma live in soil and water. These germs can enter the body through wounds or other small skin injuries, like a thorn prick. It is not known why some people develop mycetoma and others do not, but aspects of the environment and living conditions are likely involved. Mycetoma does not spread between people.

Diagnosis

A doctor can diagnose mycetoma by taking a small sample (biopsy) of the infected area of the body and sending it to a laboratory. The laboratory may examine the sample under a microscope, but this test may not always determine if the infection is caused by bacteria or fungi and cannot determine what type of bacteria or fungus is the cause of the mycetoma.

A culture (growing the bacteria or fungi in the laboratory) can determine the specific type of bacteria or fungus causing the infection. A doctor may also do an imaging test such as an X-ray or ultrasound to diagnose mycetoma and see how much damage has taken place to muscle and bone. Patients can avoid long-term infection and amputation by seeking care and detecting and treating mycetoma early.

Treatment

The treatment for mycetoma depends on whether it is caused by bacteria (actinomycetoma) or fungi (eumycetoma).

- Actinomycetoma is usually treatable with antibiotics, and surgery is usually not needed.
- Eumycetoma is usually treated with long-term antifungal medication, but treatment may not be completely effective. In this case, surgery or amputation are sometimes needed to cut away the infection tissue.

What is dengue?

Dengue viruses are spread to people through the bite of an infected *Aedes* species (*Ae. aegypti* or *Ae. albopictus*) mosquito. Dengue is common in more than 100 countries around the world. Forty percent of the world's population, about 3 billion people, live in areas with a risk of dengue. Dengue is often a leading cause of illness in areas with risk.

Transmission

Through Mosquito Bites

***Aedes aegypti* mosquito.**

Dengue viruses are spread to people through the bites of infected *Aedes* species mosquitoes (*Ae. aegypti* or *Ae. albopictus*). These are the same types of mosquitoes that spread Zika and chikungunya viruses.

- ✓ These mosquitoes typically lay eggs near standing water in containers that hold water, like buckets, bowls, animal dishes, flower pots, and vases.
- ✓ These mosquitoes prefer to bite people, and live both indoors and outdoors near people.
- ✓ Mosquitoes that spread dengue, chikungunya, and Zika bite during the day and night.

- ✓ Mosquitoes become infected when they bite a person infected with the virus. Infected mosquitoes can then spread the virus to other people through bites.

***Aedes albopictus* mosquito.**

From mother to child

- ✓ A pregnant woman already infected with dengue can pass the virus to her fetus during pregnancy or around the time of birth.
- ✓ To date, there has been one documented report of dengue spread through breast milk. Because of the benefits of breastfeeding, mothers are encouraged to breastfeed even in areas with risk of dengue.

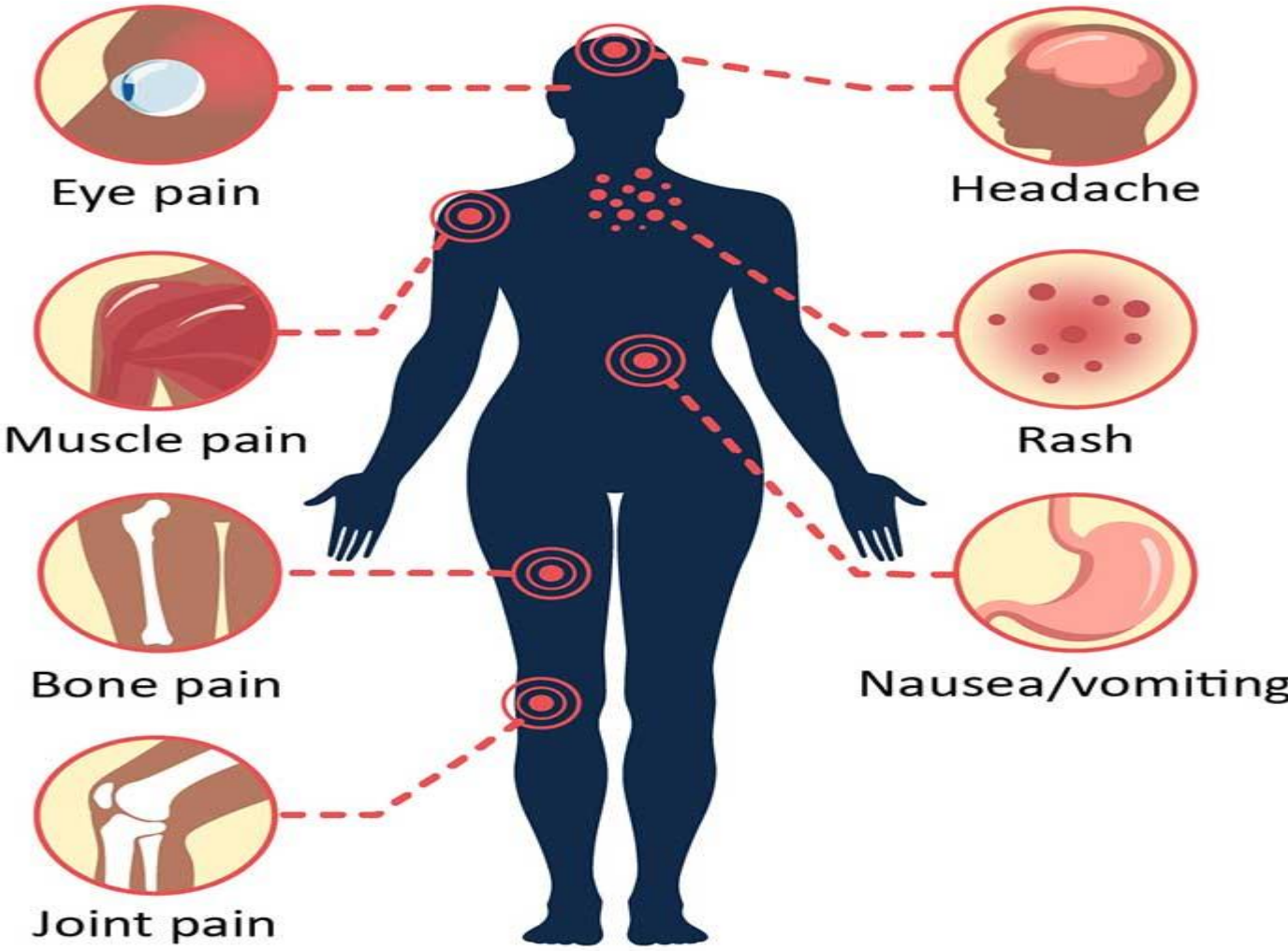
Prevention

- ✓ Prevent dengue by avoiding mosquito bites.

- ✓ All four dengue viruses are spread primarily through the bite of an infected *Aedes* species (*Ae. aegypti* and *Ae. albopictus*) mosquito. These mosquitoes also spread chikungunya and Zika viruses.
- ✓ The mosquitoes that spread dengue are found in most tropical and subtropical regions of the world, including many parts of the United States.
- ✓ *Ae. aegypti* and *Ae. albopictus* bite during the day and night.
- ✓ A dengue vaccine is available for use in some parts of the world, including United States territories.

Symptoms

- Mild symptoms of dengue can be confused with other illnesses that cause fever, aches and pains, or a rash.



The most common symptom of dengue is fever with any of the following:

- Nausea, vomiting
- Rash
- Aches and pains (eye pain, typically behind the eyes, muscle, joint, or bone pain)
- Any warning sign

Symptoms of dengue typically last 2–7 days. Most people will recover after about_a week

Treatment

- There is no specific medication to treat dengue.
- Treat the symptoms of dengue and see your healthcare provider.
- About 1 in 20 people who get sick with dengue will develop severe dengue.
- Severe dengue is a more serious form of disease that can result in shock, internal bleeding, and even death.
- You are more likely to develop severe dengue if you have had a dengue infection before.
- Infants and pregnant women are at increased risk for developing severe dengue.

Symptoms of severe dengue

Warning signs of severe dengue

Watch for signs and symptoms of severe dengue. Warning signs generally begin in the 24–48 hours after your fever has gone away.

If you or a family member develops any of the following symptoms, immediately go to a local clinic or emergency room:

- Stomach or belly pain, tenderness
- Vomiting (at least 3 times in 24 hours)
- Bleeding from the nose or gums
- Vomiting blood, or blood in the stool
- Feeling tired, restless, or irritable

Treatment of severe dengue

- If you develop any warning signs, see a healthcare provider or go to the emergency room immediately.
- Severe dengue is a medical emergency and requires immediate medical attention or hospitalization.

Parasites - Guinea Worm

Latest on Guinea Worm Eradication:

The program has made great strides from 3.5 million cases annually in the mid-1980s to 28 human cases in 2018. Global eradication is within reach

Guinea worm disease, a Neglected Tropical Disease (NTD), is caused by the parasite *Dracunculus medinensis*. The disease affects poor communities in remote parts of Africa that do not have safe water to drink. There is neither a drug treatment for Guinea worm disease nor a vaccine to prevent it. Great progress has been made towards elimination of Guinea worm disease; the number of human cases annually has fallen from 3.5 million in the mid-1980s to 28 in 2018.

Epidemiology & Risk Factors

Collecting water from a stagnant pool. Photo credit: Emily Staub, 2004, The Carter Center.

Today, GWD affects poor communities in remote parts of Africa that do not have safe water to drink. People become infected with Guinea worm by drinking stagnant water containing copepods (tiny “water fleas” too small to be clearly seen without a magnifying glass) that carry Guinea worm larvae (immature forms of the worm). The larvae are swallowed by the copepods that live in these stagnant water sources. The larvae need

about 2 weeks to mature inside the copepods before they can infect humans. Unsafe stagnant water includes ponds, pools in drying riverbeds, and shallow hand-dug wells without surrounding protective walls. Anyone who drinks from contaminated water sources can become infected. GWD is not normally caught from drinking flowing water (rivers and streams)

Alternatively, persons who live in countries where GWD is occurring (such as Chad, Ethiopia, Mali, and South Sudan) and consume raw or undercooked aquatic animals (such as small whole fish that have not been gutted, other fish, and frogs) might also be at risk for GWD

GWD transmission has a seasonal pattern. In dry regions, people generally get infected during the rainy season, when stagnant surface water is available. In wet regions, people generally get infected during the dry season, when surface water is drying up and becoming stagnant

The risk for disease varies by sex, age, profession, and ethnicity. These differences reflect how and where people get their drinking water in different areas and countries. In general, about the same number of men and women get infected. GWD occurs in all age groups but it is most common among young adults 15–45 years old. This may be because of the type of work done by people this age.

Farmers, herders, and those fetching drinking water for the household may be more likely to become infected, possibly because they drink contaminated stagnant water while away from home. In certain areas, GWD affects some ethnic groups more than others

The greatest risk for GWD is having GWD the year before. People do not become immune to infection. Many people in affected villages suffer from GWD year after year. This is probably because the same water sources are repeatedly contaminated and conditions that support the spread of disease have not changed. It might also be related to some biological characteristic of the person that increases susceptibility. Not

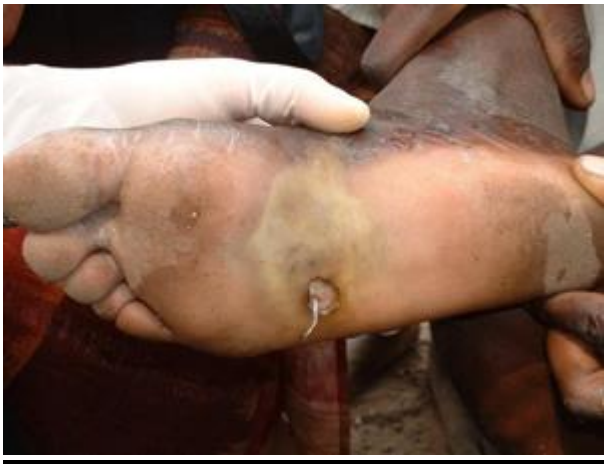
everyone drinking from the same contaminated water supply will become infected. A few people seem to keep getting infected while others drinking the same water do not

Since 2012, an unusual epidemiologic pattern has been recognized in Chad. While the number of cases in humans has remained limited, there have been large numbers of cases recognized in dogs, particularly in the area along the Chari River. This has led to consideration of the possibility of GWD transmission though a previously unrecognized route—consumption of fish, frogs, or other aquatic animals that carry Guinea worm larvae, but do not themselves suffer the effects of transmission [6].

The situation is being carefully investigated [7] and control measures (tethering of dogs, education to remind area residents to fully cook food and not feed fish guts to dogs) have been implemented[4].

While most Guinea worm infections in animals have occurred in dogs and most dog infections have occurred in Chad, dog infections have occurred in other countries as well and Guinea worms have infected other types of animals too. In 2018, Chad reported 1,040 Guinea worm-infected dogs and 25 cats; Ethiopia reported 11 infected dogs, five cats, and one baboon; and Mali reported 18 infected dogs and two cats.

Disease



Emergence of a Guinea worm from a foot. Photo credit: E. Wolfe, 2003,The Carter Center.

Symptoms

People with Guinea worm disease (GWD) have no symptoms for about 1 year. Then, the person begins to feel ill. Symptoms can include the following:

- Slight fever
- Itchy rash
- Nausea
- Vomiting
- Diarrhea
- Dizziness

A blister then develops. This blister can form anywhere on the skin. However, the blister forms on the lower body parts in 80%–90% of cases. This blister gets bigger over several days and causes a burning pain. The blister eventually ruptures, exposing the worm. The infected person may put the affected body part in cool water to ease the symptoms or may enter water to perform daily tasks, such as fetching drinking water. On contact with water, the worm discharges hundreds of thousands of larvae into the water.

Painful extraction of a Guinea worm. Credit: The Carter Center/Louise Gubb, 2007

Complications

In addition to the pain of the blister, removing the worm is also very painful. Furthermore, without proper care the wound often becomes infected by bacteria. These wound infections can then result in one or more of the following complications:

- Redness and swelling of the skin (cellulitis)
- Boils (abscesses)
- Generalized infection (sepsis)
- Joint infections (septic arthritis) that can cause the joints to lock and deform (contractures)
- Lock jaw (tetanus)

If the worm breaks during removal it can cause intense inflammation as the remaining part of the dead worm starts to degrade inside the body. This causes more pain, swelling, and cellulitis.

Disability

While the death rate is low, disability is a common outcome of GWD. People have difficulty moving around because of pain and complications caused by secondary bacterial infections. The disability that occurs during worm removal and recovery prevents people from working in their fields, tending animals, going to school, and caring for their families.

Disability lasts 8.5 weeks on average but sometimes can be permanent. When GWD was more common, the negative impacts on farming and livestock tending caused financial losses in the millions of dollars each year. In some villages where infection rates were high, more than 60% of children missed school. Some children were disabled by infection. Other children needed to work in place of disabled family members

GWD only occurs in the poorest 10% of the world's population who have no access to safe drinking water or health care. Therefore, GWD is both a disease of poverty and a cause of poverty

Management & Treatment

Management of Guinea Worm Disease

When the Guinea worm is ready to come out of the body, it creates a painful burning blister on the skin. The blister eventually ruptures, exposing the worm. Management of Guinea worm disease (GWD) involves removing the whole worm and caring for the wound in general. There is no specific drug to treat or prevent GWD. There is also no vaccine to prevent GWD.

Optimal management of GWD involves the following steps

1. First, the infected person is not allowed to enter drinking water sources.
2. Next, the wound is cleaned. The affected body part may be immersed or soaked in water (far away from any water source to prevent contamination) to encourage the worm to contract and release larvae. Emptying the worm of larvae may make removing the worm easier.
3. The worm is then wrapped around a rolled piece of gauze or a stick to maintain some tension on the worm and encourage more of the worm to emerge. This also prevents the worm from slipping back inside.
4. Then, gentle traction is applied to the worm to slowly pull it out. Pulling stops when resistance is met to avoid breaking the worm. Because the worm can be as long as one meter in length, full extraction can take several days to weeks.
5. Afterwards, topical antibiotics are applied to the wound to prevent secondary bacterial infections.
6. The affected body part is then bandaged with fresh gauze to protect the site. Medicines, such as aspirin or ibuprofen, are given to help ease the pain of this process and reduce inflammation.
7. These steps are repeated every day until the whole worm is successfully pulled out

Prevention & Control

Guinea Worm Eradication Program Interventions

The Guinea Worm Eradication Program (GWEP) is a group of national and international partners whose purpose is to support the global eradication of Guinea worm disease (GWD). Prevention of GWD is based on the following:

Surveillance (case detection) and case containment (preventing contamination of drinking water sources by infected persons or animals)

- ✓ Provision of safe drinking water
- ✓ Vector control (killing of the copepods involved in the Guinea worm life cycle) using the approved chemical temephos
- ✓ Health education and community mobilization.

Many of these interventions are provided by village volunteers—people who are selected by the community to work with the GWEP. Village volunteers are the backbone of the program. In their communities, they identify and manage people with GWD and prevent them from contaminating drinking water sources (case containment). They also distribute water filters and provide health education to the community.

Surveillance and Case Containment

GWEP village volunteers look daily for GWD cases in their communities. Every month they report the total number of cases detected in their communities to supervisors who compile this and send it to the national GWEP headquarters. This information is then shared with The Carter Center and the World Health Organization (WHO). The GWEP uses this information to identify where transmission is ongoing and to understand how the disease is spreading.

Case containment is one of the key methods used to prevent the spread of GWD. Case containment centers have been built in strategic locations in several countries[1]. These

centers provide treatment and support to people with GWD and help prevent them from contaminating water sources.

A case of GWD is considered to be contained when

1. The person is identified within 24 hours of the worm emerging; AND
2. The person has not entered any water source since the worm has emerged; AND
3. The person receives proper treatment and case management by a local health provider, by cleaning and bandaging the wound until the worm has been fully removed manually and by providing health education to discourage the patient from contaminating any water source (if two or more emerging worms are present, transmission is not contained until the last worm is removed); AND
4. Within seven days of the worm emerging, a GWEP supervisor determines that the above criteria have been met and the case is truly GWD; AND
5. The approved chemical temephos is used to treat potentially contaminated surface water if there is any uncertainty about contamination or if contamination was known to have occurred and if the water body in question meets certain other logistical criteria.

Safe Water

Guinea worm filter cloth. Credit: WHO Collaborating Center for Dracunculiasis Eradication Archives

Safe drinking water sources include bore-hole wells and deep hand-dug wells with protective walls around them that prevent contaminated water from flowing back into the well (e.g., after rains or floods or if someone pours/spills water nearby the well).

Flowing water, such as that found in a stream or river, is also safe from Guinea worm. The GWEP advocates for the development and maintenance of safe drinking water sources. It also encourages treatment of potentially contaminated drinking water.

Fine-mesh cloth filters are given to households to strain out copepods (tiny “water fleas” too small to be clearly seen without a magnifying glass) from contaminated drinking water where there are no safe water supplies. People who travel or work away from the household and might not have access to filtered water are given individual pipe filters. These devices are used like straws to drink water from unsafe water sources

Vector Control

A vector is an organism that carries or transmits disease. The vector for GWD is the copepod. To control this vector, the GWEP puts a measured amount of the approved chemical temephos (ABATE®*) into the water sources that are suspected or known to be contaminated with Guinea worm-infected copepods. This chemical kills the infected copepods and prevents people from becoming infected with GWD when they drink the water.

Nigerian woman using a pipe filter to drink water directly from a pond. Credit: The Carter Center/Emily Staub, 2002

Health Education and Community Mobilization

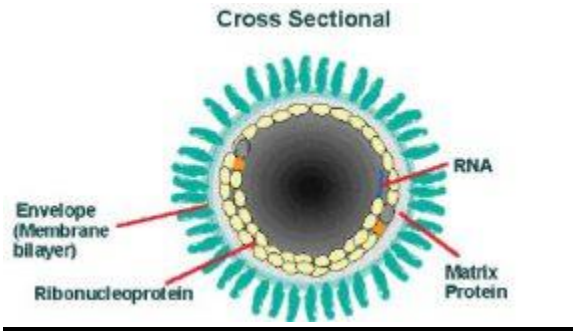
Health education and community mobilization are important aspects of GWD eradication. Activities include the following:

- Teaching communities about the disease and how it is spread
  - ✓ Educating people during household visits by GWEP volunteers and staff and through organized events, such as Worm Weeks
- Helping villagers take action against the disease
  - ✓ Preventing people with emerging worms from entering and contaminating drinking water supplies
  - ✓ Using water filters to protect against GWD
- Helping villagers understand the need for safe chemical treatment (temephos) in their water supplies

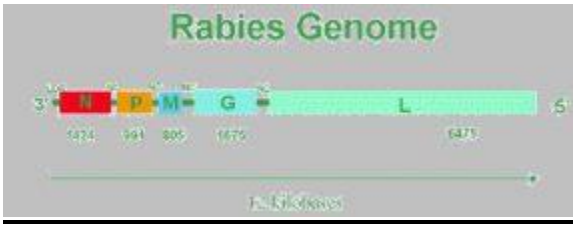
Rabies

Rabies is a preventable viral disease most often transmitted through the bite of a rabid animal. The rabies virus infects the central nervous system of mammals, ultimately causing disease in the brain and death.

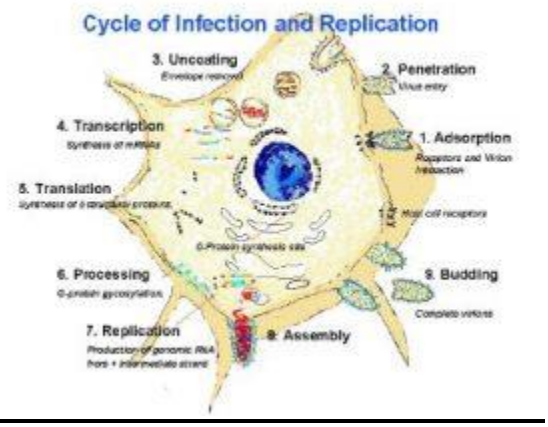
The vast majority of rabies cases reported to the Centers for Disease Control and Prevention (CDC) each year occur in wild animals like bats, raccoons, skunks, and foxes, although any mammal can get rabies



The cross-sectional diagram demonstrates the concentric layers: envelope membrane bilayer, M protein, and tightly coiled encased genomic RNA.



The rabies virus genome is single-stranded, antisense, nonsegmented, RNA of approximately 12 kb. There is a leader-sequence (LDR) of approximately 50 nucleotides, followed by N, P, M, G, and L genes.



1: Adsorption (receptors and virioninteration).

2: Penetration (virus entry).

3: Uncoating (envelope removal).

4. Transcription (synthesis of mRNAs).

5. Translation (Synthesis of structural proteins).

6. Processing (G-protein gycosylation).

7. Replication (production of genomic RNA from intermediate strand.

8. Assembly.

9: Budding (complete virions)

The Rabies Virus

Rabies virus belongs to the order Mononegavirales, viruses with anonsegmented, negative-stranded RNA genomes. Within this group, viruses with a distinct “bullet” shape are classified in the Rhabdoviridae family, which includes at least three genera of animal viruses, Lyssavirus, Ephemerovirus, and Vesiculovirus. The genus Lyssavirus includes rabies virus, Lagos bat, Mokola virus, Duvenhage virus, European bat virus 1 & 2 and Australian bat virus.

How is rabies transmitted?

Rabies virus is transmitted through direct contact (such as through broken skin or mucous membranes in the eyes, nose, or mouth) with saliva or brain/nervous system tissue from an infected animal.

People usually get rabies from the bite of a rabid animal. It is also possible, but rare, for people to get rabies from non-bite exposures, which can include scratches, abrasions, or open wounds that are exposed to saliva or other potentially infectious material from a rabid animal. Other types of contact, such as petting a rabid animal or contact with the blood, urine or feces of a rabid animal, are not associated with risk for infection and are not considered to be exposures of concern for rabies.

Other modes of transmission—aside from bites and scratches—are uncommon. Inhalation of aerosolized rabies virus is one potential non-bite route of exposure, but except for laboratory workers, most people won't encounter an aerosol of rabies virus. Rabies transmission through corneal and solid organ transplants have been recorded, but they are also very rare. There have only been two known solid organ donor with rabies in the United States since 2008. Many organ procurement organizations have added a screening question about rabies exposure to their procedures for evaluating the suitability of each donor.

Bite and non-bite exposures from an infected person could theoretically transmit rabies, but no such cases have been documented. Casual contact, such as touching a person with rabies or contact with non-infectious fluid or tissue (urine, blood, feces), is not associated with risk for infection. Contact with someone who is receiving rabies vaccination does not constitute rabies exposure, does not pose a risk for infection, and does not require postexposure prophylaxis

Rabies virus becomes noninfectious when it dries out and when it is exposed to sunlight.

What are the signs and symptoms of rabies?

After a bite or other rabies exposure, the rabies virus has to travel through the body to the brain before it can cause symptoms. This time between the exposure and the appearance of symptoms is called the incubation period, and it may last for weeks to months. The incubation period may vary based on the location of the exposure site (how far away it is from the brain), the type of rabies virus, and any existing immunity

The first symptoms of rabies may be very similar to those of the flu including general weakness or discomfort, fever, or headache. These symptoms may last for days.

There may be also discomfort or a prickling or itching sensation at the site of the bite, progressing within days to acute symptoms of cerebral dysfunction, anxiety, confusion, and agitation. As the disease progresses, the person may experience delirium, abnormal behavior, hallucinations, hydrophobia (fear of water), and insomnia. The acute period of disease typically ends after 2 to 10 days.

Once clinical signs of rabies appear, the disease is nearly always fatal, and treatment is typically supportive. To date less than 20 cases of human survival from clinical rabies have been documented, and only a few survivors had no history of pre- or postexposure prophylaxis.

The signs, symptoms, and outcome of rabies in animals can vary, but are often similar to those in humans, including early nonspecific symptoms, acute neurologic symptoms, and ultimately death.

How is rabies diagnoses

In animals, rabies is diagnosed using the direct fluorescent antibody (DFA) test, which looks for the presence of rabies virus antigens in brain tissue. In humans, several tests are required.

Rapid and accurate laboratory diagnosis of rabies in humans and other animals is essential for timely administration of postexposure prophylaxis. Within a few hours, a diagnostic laboratory can determine whether or not an animal is rabid and inform the responsible medical personnel. The laboratory results may save a patient from unnecessary physical and psychological trauma, and financial burdens, if the animal is not rabid.

In addition, laboratory identification of positive rabies cases may aid in defining current epidemiologic patterns of disease and provide appropriate information for the development of rabies control programs.

The nature of rabies disease dictates that laboratory tests be standardized, rapid, sensitive, specific, economical, and reliable.

Prevent rabies in animals

There are several things you can do to protect your pet from rabies.

1. First, visit your veterinarian with your pet on a regular basis and keep rabies vaccinations up-to-date for all cats, ferrets, and dogs.

2. Second, maintain control of your pets by keeping cats and ferrets indoors and keeping dogs under direct supervision.

3. Third, spay or neuter your pets to help reduce the number of unwanted pets that may not be properly cared for or vaccinated regularly.

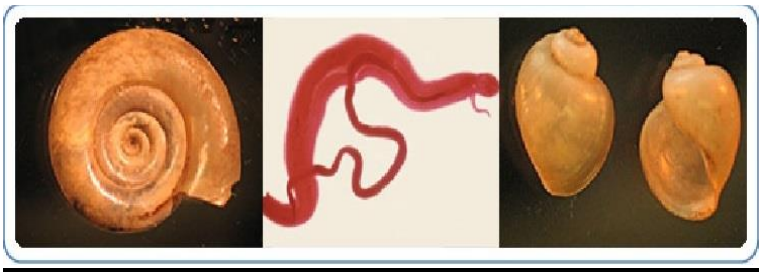
Finally, call animal control to remove all stray animals from your neighborhood since these animals may be unvaccinated or ill.

The importance of vaccinating your pet

While wildlife are much more likely to be rabid than are domestic animals in the United States, people have much more contact with domestic animals than with wildlife. Your pets and other domestic animals can be infected when they are bitten by rabid wild animals, and this type of “spillover” increases the risk to people.

Keeping your pets up to date on their rabies vaccination will prevent them from acquiring the disease from wildlife, and thereby prevent possible transmission to your family or other people

Parasites - Schistosomiasis



Schistosomiasis, also known as bilharzia, is a disease caused by parasitic worms. Although the worms that cause schistosomiasis are not found in the United States, people are infected worldwide. In terms of impact this disease is second only to malaria as the most devastating parasitic disease.

Schistosomiasis is considered one of the neglected tropical diseases (NTDs).The parasites that cause schistosomiasis live in certain types of freshwater snails. The infectious form of the parasite, known as cercariae, emerge from the snail into the water. You can become infected when your skin comes in contact with contaminated freshwater. Most human infections are caused by Schistosoma mansoni, S. haematobium, or S. japonicum.

Image: Left: Biomphalaria sp., the intermediate host for S. mansoni. Right: Bulinus sp., the intermediate host for S. haematobium and S. intercalatum. Center: Adults of S. mansoni. The thin female resides in the gynecophoral canal of the thicker male. Credit

Epidemiology & Risk Factors

Schistosomiasis is an important cause of disease in many parts of the world, most commonly in places with poor sanitation. School-age children who live in these areas are often most at risk because they tend to spend time swimming or bathing in water

containing infectious cercariae.

If you live in, or travel to, areas where schistosomiasis is found and are exposed to contaminated freshwater, you are at risk.

Areas where human schistosomiasis is found include:

- *Schistosoma mansoni*
  - ✓ Distributed throughout Africa: There is risk of infection in freshwater in southern and sub-Saharan Africa–including the great lakes and rivers as well as smaller bodies of water. Transmission also occurs in the Nile River valley in Sudan and Egypt.
  - ✓ South America: Including Brazil, Suriname, and Venezuela.
  - ✓ Caribbean (risk is very low): Dominican Republic, Guadeloupe, Martinique, and Saint Lucia.
- *S. haematobium*
  - ✓ Distributed throughout Africa: There is risk of infection in freshwater in southern and sub-Saharan Africa–including the great lakes and rivers as well as smaller bodies of water. Transmission also occurs in the Nile River valley in Egypt and the Mahgreb region of North Africa.
  - ✓ Found in areas of the Middle East.
  - ✓ A recent focus of ongoing transmission has been identified in Corsica.
- *S. japonicum*
  - ✓ Found in Indonesia and parts of China and Southeast Asia.
- *S. mekongi*
  - ✓ Found in Cambodia and Laos.
- *S. intercalatum*
  - ✓ Found in parts of Central and West Africa

Disease

Infection occurs when skin comes in contact with contaminated freshwater in which certain types of snails that carry the parasite are living. Freshwater becomes

contaminated by schistosome eggs when infected people urinate or defecate in the water.

The eggs hatch, and if the appropriate species of snails are present in the water, the parasites infect, develop and multiply inside the snails. The parasite leaves the snail and enters the water where it can survive for about 48 hours. Larval schistosomes (cercariae) can penetrate the skin of persons who come in contact with contaminated freshwater, typically when wading, swimming, bathing, or washing.

Over several weeks, the parasites migrate through host tissue and develop into adult worms inside the blood vessels of the body. Once mature, the worms mate and females produce eggs. Some of these eggs travel to the bladder or intestine and are passed into the urine or stool.

Symptoms of schistosomiasis

Are caused not by the worms themselves but by the body's reaction to the eggs. Eggs shed by the adult worms that do not pass out of the body can become lodged in the intestine or bladder, causing inflammation or scarring. Children who are repeatedly infected can develop anemia, malnutrition, and learning difficulties. After years of infection, the parasite can also damage the liver, intestine, spleen, lungs, and bladder.

Common Symptoms

Most people have no symptoms when they are first infected. However, within days after becoming infected, they may develop a rash or itchy skin. Within 1-2 months of infection, symptoms may develop including fever, chills, cough, and muscle aches.

Chronic schistosomiasis

Without treatment, schistosomiasis can persist for years. Signs and symptoms of chronic schistosomiasis include: abdominal pain, enlarged liver, blood in the stool or

blood in the urine, and problems passing urine. Chronic infection can also lead to increased risk of liver fibrosis or bladder cancer.

Diagnosis

Stool or urine samples can be examined microscopically for parasite eggs (stool for *S. mansoni* or *S. japonicum* eggs and urine for *S. haematobium* eggs). The eggs tend to be passed intermittently and in small amounts and may not be detected, so it may be necessary to perform a blood (serologic) test.

Treatment

Safe and effective medication is available for treatment of both urinary and intestinal schistosomiasis. Praziquantel, a prescription medication, is taken for 1-2 days to treat infections caused by all schistosome species

Prevention & Control

Prevention

No vaccine is available.

The best way to prevent schistosomiasis is to take the following steps if you are visiting or live in an area where schistosomiasis is transmitted:

- ✓ Avoid swimming or wading in freshwater when you are in countries in which schistosomiasis occurs. Swimming in the ocean and in chlorinated swimming pools is safe.
- ✓ Drink safe water. Although schistosomiasis is not transmitted by swallowing contaminated water, if your mouth or lips come in contact with water containing the parasites, you could become infected. Because water coming directly from canals, lakes, rivers, streams, or springs may be contaminated with a variety of infectious organisms, you should either bring your water to a rolling boil for 1 minute or filter water before drinking it.

- ✓ Water used for bathing should be brought to a rolling boil for 1 minute to kill any cercariae, and then cooled before bathing to avoid scalding.
- ✓ Vigorous towel drying after an accidental, very brief water exposure may help to prevent parasites from penetrating the skin. However, do not rely on vigorous towel drying alone to prevent schistosomiasis.

Those who have had contact with potentially contaminated water overseas should see their health care provider after returning from travel to discuss testing.

Control

In countries where schistosomiasis causes significant disease, control efforts usually focus on:

- Reducing the number of infections in people and/or
- Eliminating the snails that are required to maintain the parasite's life cycle.

For all species that cause schistosomiasis, improved sanitation could reduce or eliminate transmission of this disease. In some areas with lower transmission levels, elimination of schistosomiasis is considered a "winnable battle" by public health officials.

Control measures can include mass drug treatment of entire communities and targeted treatment of school-age children. Some of the problems with control of schistosomiasis include:

- Chemicals used to eliminate snails in freshwater sources may harm other species of animals in the water and, if treatment is not sustained, the snails may return to those sites afterwards.
- For certain species of the parasite, such as *S. japonicum*, animals such as cows or water buffalo can also be infected. Runoff from pastures (if livestock are infected) can contaminate freshwater sources.

Parasites - Soil-transmitted helminths

Soil-transmitted helminths refer to the intestinal worms infecting humans that are transmitted through contaminated soil ("helminth" means parasitic worm): *Ascaris lumbricoides* (sometimes called just "*Ascaris*"), whipworm (*Trichuris trichiura*), and hookworm (*Anclostoma duodenale* and *Necator americanus*). A large part of the world's population is infected with one or more of these soil-transmitted helminths**:**

- ✓ approximately 807-1,121 million with *Ascaris*
- ✓ approximately 604-795 million with whipworm
- ✓ approximately 576-740 million with hookworm

Soil-transmitted helminth infection is found mainly in areas with warm and moist climates where sanitation and hygiene are poor, including in temperate zones during warmer months. These STHs are considered Neglected Tropical Diseases (NTDs) because they inflict tremendous disability and suffering yet can be controlled or eliminated.

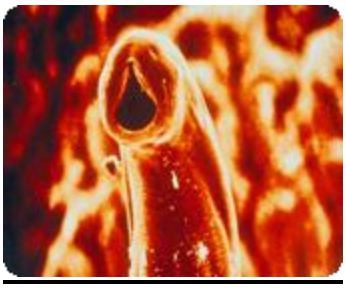
Soil-transmitted helminths live in the intestine and their eggs are passed in the feces of infected persons. If an infected person defecates outside (near bushes, in a garden, or field) or if the feces of an infected person are used as fertilizer, eggs are deposited on soil. *Ascaris* and hookworm eggs become infective as they mature in soil. People are infected with *Ascaris* and whipworm when eggs are ingested.

This can happen when hands or fingers that have contaminated dirt on them are put in the mouth or by consuming vegetables and fruits that have not been carefully cooked, washed or peeled. Hookworm eggs are not infective.

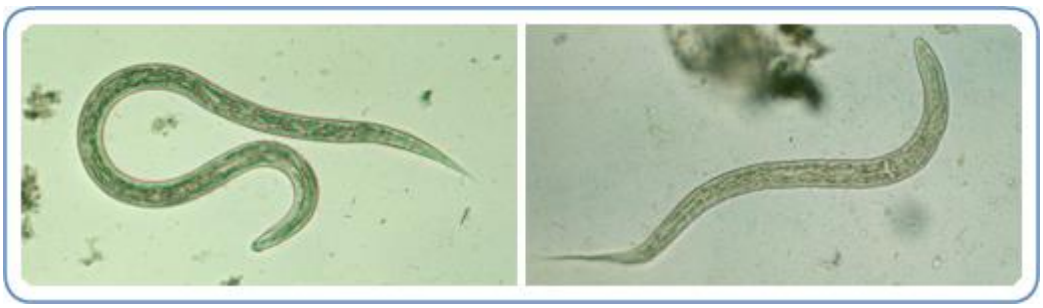
They hatch in soil, releasing larvae (immature worms) that mature into a form that can penetrate the skin of humans. Hookworm infection is transmitted primarily by walking barefoot on contaminated soil. One kind of hookworm (*Anclostoma duodenale*) can also be transmitted through the ingestion of larvae.

People with light soil-transmitted helminth infections usually have no symptoms. Heavy infections can cause a range of health problems, including abdominal pain, diarrhea, blood and protein loss, rectal prolapse, and physical and cognitive growth retardation. Soil-transmitted helminth infections are treatable with medication prescribed by your health care provider.

Hookworm



An estimated 576-740 million people in the world are infected with hookworm. Hookworm was widespread in the southeastern United States until the early 20th century but is now nearly eliminated. Hookworm, *Ascaris*, and whipworm are known as soil-transmitted helminths (parasitic worms). Together, they account for a major burden of disease worldwide.



An estimated 576-740 million people in the world are infected with hookworm. Hookworm was once widespread in the United States, particularly in the southeastern region, but improvements in living conditions have greatly reduced hookworm infections. Hookworm, *Ascaris*, and whipworm are known as soil-transmitted helminths (parasitic worms). Together, they account for a major burden of disease worldwide.

Hookworms live in the small intestine. Hookworm eggs are passed in the feces of an infected person. If the infected person defecates outside (near bushes, in a garden, or field) of if the feces of an infected person are used as fertilizer, eggs are deposited on soil. They can then mature and hatch, releasing larvae (immature worms).

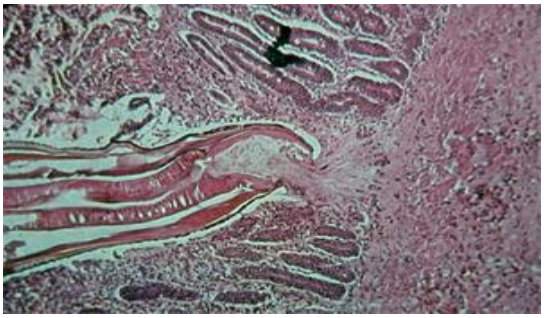
The larvae mature into a form that can penetrate the skin of humans. Hookworm infection is mainly acquired by walking barefoot on contaminated soil. One kind of hookworm can also be transmitted through the ingestion of larvae.

Most people infected with hookworms have no symptoms. Some have gastrointestinal symptoms, especially persons who are infected for the first time. The most serious effects of hookworm infection are blood loss leading to anemia, in addition to protein loss. Hookworm infections are treatable with medication prescribed by your health care provider.

Epidemiology & Risk Factors

Hookworm is a soil-transmitted helminth (STH) and is one of the most common roundworm of humans. Infection is caused by the nematode parasites *Necator americanus* and *Ancylostoma duodenale*. Hookworm infections often occur in areas where human feces are used as fertilizer or where defecation onto soil happens

Disease



Highly magnified histologic section showing hookworm (*Ancylostoma* sp) attached to the intestine.

High-intensity hookworm infections occur among both school-age children and adults, unlike the soil-transmitted helminths *Ascaris* and whipworm. High-intensity infections with these worms are less common among adults. The most serious effects of hookworm infection are the development of anemia and protein deficiency caused by blood loss at the site of the intestinal attachment of the adult worms. When children are continuously infected by many worms, the loss of iron and protein can retard growth and mental development

Diagnosis

The standard method for diagnosing the presence of hookworm is by identifying hookworm eggs in a stool sample using a microscope. Because eggs may be difficult to find in light infections, a concentration procedure is recommended

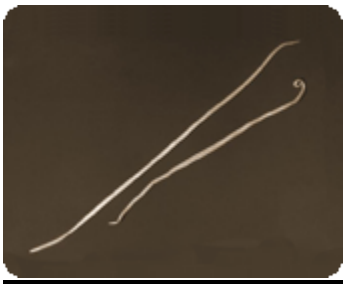
Treatment

Anthelminthic medications (drugs that rid the body of parasitic worms), such as albendazole and mebendazole, are the drugs of choice for treatment of hookworm infections. Infections are generally treated for 1-3 days. The recommended medications are effective and appear to have few side effects. Iron supplements may also be prescribed if the infected person has anemia

Prevention & Control

The best way to avoid hookworm infection is not to walk barefoot in areas where hookworm is common and where there may be human fecal contamination of the soil. Also, avoid other skin contact with such soil and avoid ingesting it. Infection can also be prevented by not defecating outdoors and by effective sewage disposal systems.

Ascaris



An estimated 807-1,221 million people in the world are infected with *Ascaris lumbricoides* (sometimes called just “Ascaris”). *Ascaris*, hookworm, and whipworm are known as soil-transmitted helminths (parasitic worms). Together, they account for a major burden of disease worldwide. Ascariasis is now uncommon in the United States**.**

An estimated 807 million–1.2 billion people in the world are infected with *Ascaris lumbricoides* (sometimes called just *Ascaris* or ascariasis). *Ascaris*, hookworm, and whipworm are parasitic worms known as soil-transmitted helminths (STH). Together, they account for a major burden of parasitic disease worldwide. Ascariasis is now uncommon in the United States.

Ascaris parasites live in the intestine and Ascaris eggs are passed in the feces (poop) of infected people. If an infected person defecates outside (for example, near bushes, in a garden, or in a field), or if the feces of an infected person are used as fertilizer, eggs are deposited on soil. The eggs can then mature into a form of the parasite that is infective. Ascariasis is caused by ingesting eggs. This can happen when hands or fingers that have contaminated dirt on them are put in the mouth, or by consuming vegetables or fruits that have not been carefully cooked, washed, or peeled.

People infected with *Ascaris* often show no symptoms. If symptoms do occur they can be light and include abdominal discomfort. Heavy infections can cause intestinal blockage and impair growth in children. Other symptoms such as cough are due to migration of the worms through the body. Ascariasis is treatable with medication prescribed by your health care provider.

Humans can also be infected by pig roundworm (*Ascaris suum*). *Ascaris* lumbricoides (human roundworm) and Ascaris suum (pig roundworm) are indistinguishable. It is unknown how many people worldwide are infected with Ascaris suum

Epidemiology & Risk Factors

Ascaris lumbricoides infection is one of the most common intestinal worm infections. It is found in association with poor personal hygiene, poor sanitation, and in places where human feces are used as fertilizer.

Ascariasis caused by Ascaris suum is found in association with pigs. People who raise pigs or use raw pig manure as fertilizer may be at risk for infection with Ascaris suum. Contact with pigs should be investigated as a potential cause upon diagnosis of ascariasis.

Disease

People infected with *Ascaris* often show no symptoms, regardless of the species of worm. If symptoms do occur they can be light and include abdominal discomfort. Heavy infections can cause intestinal blockage and impair growth in children. Other symptoms such as cough are due to migration of the worms through the body. Ascariasis is treatable with medication prescribed by your health care provider

Diagnosis

The standard method for diagnosing ascariasis is by identifying *Ascaris* eggs in a stool sample using a microscope. Because eggs may be difficult to find in light infections, a concentration procedure is recommended.

Treatment

Anthelminthic medications (drugs that rid the body of parasitic worms), such as albendazole and mebendazole, are the drugs of choice for treatment of *Ascaris* infections, regardless of the species of worm. Infections are generally treated for 1-3 days. The drugs are effective and appear to have few side effects

Prevention & Control

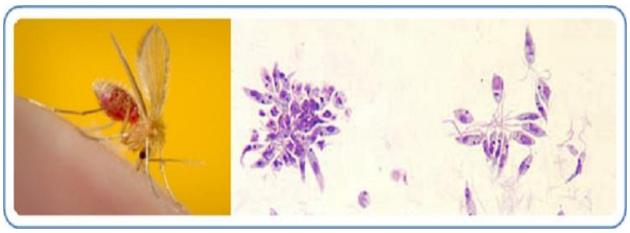
The best way to prevent people from getting ascariasis from humans or pigs is to always do the following:

- ✓ Avoid ingesting soil that may be contaminated with human or pig feces, including where human fecal matter (“night soil”), wastewater, or pig manure is used to fertilize crops.
- ✓ Wash your hands with soap and water before handling food.
- ✓ Wash your hands with soap and water after touching or handling pigs, cleaning pig pens, or handling pig manure.
- ✓ Teach children the importance of washing hands to prevent infection.
- ✓ Supervise children around pigs, ensuring that they do not put unwashed hands in their mouths.
- ✓ Wash, peel, or cook all raw vegetables and fruits before eating, particularly those that have been grown in soil that has been fertilized with manure.

Transmission of *Ascaris lumbricoides* infection to others in a community setting can be prevented by:

- ✓ Not defecating outdoors.
- ✓ Effective sewage disposal systems

Parasites - Leishmaniasis



Leishmaniasis is a parasitic disease that is found in parts of the tropics, subtropics, and southern Europe. It is classified as a neglected tropical disease (NTD). Leishmaniasis is caused by infection with *Leishmania* parasites, which are spread by the bite of phlebotomine sand flies.

There are several different forms of leishmaniasis in people. The most common forms are cutaneous leishmaniasis, which causes skin sores, and visceral leishmaniasis, which affects several internal organs (usually spleen, liver, and bone marrow).

Image: On average, the sand flies that transmit the parasite are only about one fourth the size of mosquitoes or even smaller. On the left, an example of a vector sand fly (Phlebotomus papatasi) is shown; its blood meal is visible in its distended transparent abdomen. On the right, Leishmania promastigotes from a culture are shown. The flagellated promastigote stage of the parasite is found in sand flies and in cultures

Epidemiology & Risk Factors

Leishmaniasis is found in people in focal areas of approximately 90 countries in the tropics, subtropics, and southern Europe. The ecologic settings range from rain forests to deserts. Leishmaniasis usually is more common in rural than in urban areas, but it is found in the outskirts of some cities. Climate and other environmental changes have the potential to expand the geographic range of the sand fly vectors and the areas in the world where leishmaniasis is found.

Leishmaniasis is found in people on every continent except Australia and Antarctica.

- ✓ In the Old World (the Eastern Hemisphere), leishmaniasis is found in some parts of Asia, the Middle East, Africa (particularly in the tropical region and North Africa, with some cases elsewhere), and southern Europe. It is not found in Australia or the Pacific islands.
- ✓ In the New World (the Western Hemisphere), it is found in some parts of Mexico, Central America, and South America. It is not found in Chile or Uruguay. Occasional cases of cutaneous leishmaniasis have been acquired in Texas and Oklahoma.

The number of new cases may vary or change over time and are difficult to estimate. For cutaneous leishmaniasis, estimates of the number of new cases per year have ranged from approximately 700,000 to 1.2 million or more. For visceral leishmaniasis, the estimated number of new cases per year may have decreased to <100,000, but previous estimates ranged up to 400,000 or more cases.

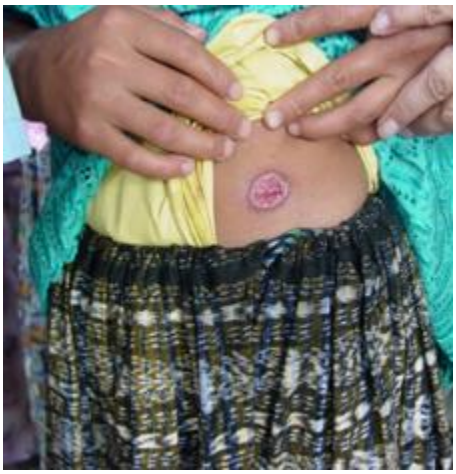
The cases of leishmaniasis evaluated in the United States reflect travel and immigration patterns. For example, many of the cases of cutaneous leishmaniasis in U.S. civilian travelers have been acquired in common tourist destinations in Latin America, such as in Costa Rica.

Overall, infection in people is caused by more than 20 species (types) of *Leishmania* parasites, which are spread by about 30 species of phlebotomine sand flies; particular species of the parasite are spread by particular sand flies. The sand fly vectors generally are the most active during twilight, evening, and night-time hours (from dusk to dawn).

In many geographic areas where leishmaniasis is found in people, infected people are not needed to maintain the transmission cycle of the parasite in nature; infected animals (such as rodents or dogs), along with sand flies, maintain the cycle. However, in some parts of the world, infected people are needed to maintain the cycle; this type of

transmission (human—sand fly—human) is called **anthroponotic**. In areas with anthroponotic transmission, effective treatment of individual patients can help control the spread of the parasite.

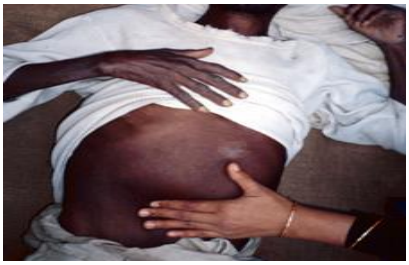
Disease



Ulcerative skin lesion, with a raised outer border, on a Guatemalan patient who has cutaneous leishmaniasis. (Credit: MERTU, Guatemala; courtesy of B. Arana)

There are several different forms of leishmaniasis in people. Some people have a silent infection, without any symptoms or signs.

The most common form is cutaneous leishmaniasis, which causes skin sores. The sores typically develop within a few weeks or months of the sand fly bite. The sores can change in size and appearance over time. The sores may start out as papules (bumps) or nodules (lumps) and may end up as ulcers (like a volcano, with a raised edge and central crater); skin ulcers might be covered by scab or crust. The sores usually are painless but can be painful. Some people have swollen glands near the sores (for example, under the arm, if the sores are on the arm or hand).

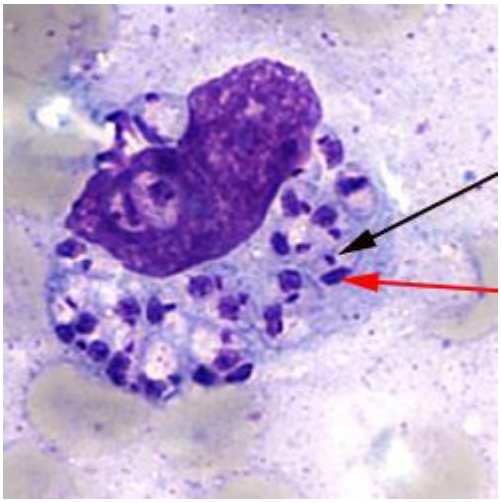


Marked splenomegaly (enlargement/swelling of the spleen) in a patient in lowland Nepal who has visceral leishmaniasis. (Credit: CDC, courtesy of C. Bern)

The other main form is **visceral leishmaniasis**, which affects several internal organs (usually spleen, liver, and bone marrow) and can be life threatening. The illness typically develops within months (sometimes as long as years) of the sand fly bite. Affected people usually have fever, weight loss, enlargement (swelling) of the spleen and liver, and low blood counts—a low red blood cell count (anemia), a low white blood cell count (leukopenia), and a low platelet count (thrombocytopenia).

Mucosal leishmaniasis is an example of one of the less common forms of leishmaniasis. This form can be a sequela (consequence) of infection with some of the species (types) of the parasite that cause cutaneous leishmaniasis in parts of Latin America: certain types of the parasite might spread from the skin and cause sores in the mucous membranes of the nose (most common location), mouth, or throat

Diagnosis



Light-microscopic examination of a stained bone marrow specimen from a patient with visceral leishmaniasis—showing a macrophage (a special type of white blood cell) containing multiple *Leishmania* amastigotes (the tissue stage of the parasite). Note that each amastigote has a nucleus (red arrow) and a rod-shaped kinetoplast (black arrow). Visualization of the kinetoplast is important for diagnostic purposes, to be confident the patient has leishmaniasis. (Credit: CDC/DPDx)

Various laboratory methods can be used to diagnose leishmaniasis—to detect the parasite as well as to identify the *Leishmania* species (type). Some of the methods are available only in reference laboratories. In the United States, CDC staff can assist with the testing for leishmaniasis.

Tissue specimens—such as from skin sores (for cutaneous leishmaniasis) or from bone marrow (for visceral leishmaniasis)—can be examined for the parasite under a microscope, in special cultures, and by molecular tests. Blood tests that detect antibody (an immune response) to the parasite can be helpful for cases of visceral leishmaniasis; tests to look for the parasite (or its DNA) itself usually also are done.

Treatment

Before considering treatment, the first step is to make sure the diagnosis is correct.

Treatment decisions should be individualized. Health care providers may consult CDC staff about the relative merits of various approaches. Examples of factors to consider include the form of leishmaniasis, the *Leishmania* species that caused it, the potential severity of the case, and the patient's underlying health.

The skin sores of cutaneous leishmaniasis usually heal on their own, even without treatment. But this can take months or even years, and the sores can leave ugly scars. Another potential concern applies to some (not all) types of the parasite found in parts of Latin America:

certain types might spread from the skin and cause sores in the mucous membranes of the nose (most common location), mouth, or throat (mucosal leishmaniasis). Mucosal leishmaniasis might not be noticed until years after the original sores healed. Ensuring adequate treatment of the cutaneous infection may help prevent mucosal leishmaniasis

Prevention & Control

No vaccines or drugs to prevent infection are available. The best way for travelers to prevent infection is to protect themselves from sand fly bites. To decrease the risk of being bitten, follow these preventive measures:

Avoid outdoor activities, especially from dusk to dawn, when sand flies generally are the most active.

When outdoors (or in unprotected quarters):

- Minimize the amount of exposed (uncovered) skin. To the extent that is tolerable in the climate, wear long-sleeved shirts, long pants, and socks; and tuck your shirt into your pants. (See below about wearing insecticide-treated clothing.)

- Apply insect repellent to exposed skin and under the ends of sleeves and pant legs. Follow the instructions on the label of the repellent. The most effective repellents generally are those that contain the chemical DEET (N,N-diethylmetatoluamide).

Note: *Bed nets, repellents, and insecticides should be purchased before traveling and can be found in hardware, camping, and military surplus stores. Bed nets and clothing that already have been treated with a pyrethroid-containing insecticide also are commercially available.*

When indoors:

- Stay in well-screened or air-conditioned areas.
- Keep in mind that sand flies are much smaller than mosquitoes and therefore can get through smaller holes.
- Spray living/sleeping areas with an insecticide to kill insects.
- If you are not sleeping in a well-screened or air-conditioned area, use a bed net and tuck it under your mattress. If possible, use a bed net that has been soaked in or sprayed with a pyrethroid-containing insecticide. The same treatment can be applied to screens, curtains, sheets, and clothing (clothing should be retreated after five washings).

Implementation

Putting the plan into action. The implementation phase of the nursing process is when the nurse put the treatment plan into effect. This typically begins with the medical staff conducting any needed medical interventions. Interventions should be specific to each patient and focus on achievable outcomes.

Actions associated in a nursing care plan include monitoring the patient for signs of change or improvement, directly caring for the patient or conducting important medical tasks, educating and guiding the patient about further health management, and referring or contacting the patient for a follow-up

Cancer is ageneral term used to describe a disturbance of cellular growth and refers to a group of diseases and not a single disease entity. Because cancer is a cellular disease, it can arise from any body tissue, with manifestations that result from failure to control the proliferation and maturation of cells.

There are more than 150 different types of cancer, including breast cancer, skin cancer, lung cancer, colon cancer, prostate cancer, and lymphoma. Symptoms vary depending on the type. Cancer treatment may include chemotherapy, radiation, and/or surgery

Nurses have a huge set of responsibilities for handling a patient with cancer. Nursing care plans for cancer involves assessment, support for therapies (e.g., chemotherapy, radiation, etc.), pain control, promoting nutrition, and emotional support

Nursing care involves the support of the general well-being of our patients, the provision of episodic acute care and rehabilitation, and when a return to health is not possible a peaceful death. Dying is a profound transition for the individual. As healthcare providers, we become skilled in nursing and medical science, but the care of the dying person encompasses much more. Certain aspects of this care are taking on more importance for patients, families, and healthcare providers.

Hospice care provides comprehensive physical, psychological, social, and spiritual care for terminally ill patients. Most hospice programs serve terminally ill patients from the comforts and relaxed surroundings of their own home, although there are some located in inpatient settings.

The goal of the hospice care team is to help the patient achieve a full life as possible, with minimal pain, discomfort, and restriction. It also emphasizes a coordinated team effort to help the patient and family members overcome the severe anxiety, fear, and depression that occur with a terminal illness.

To that end, hospice staffs encourage family members to help and participate in patient care, thereby providing the patient with warmth and security and helping the family caregivers begin the grieving process even before the patient dies.

Everyone involved in this method of care must be committed to high-quality patient care, unafraid of emotional involvement, and comfortable with personal feelings about death and dying. Good hospice care also requires open communication among team members, not just for evaluating patient care but also for helping the staff cope with their own feelings.

Recent studies have identified barriers to end-of-life care including patient or family member's avoidance of death, the influence of managed care on end-of-life care, and lack of continuity of care across settings. In addition, if the dying patient requires a lengthy period of care or complicated physical care, there is the likelihood of caregiver fatigue (psychological and physical) that can compromise the care provided.

The best opportunity for quality care occurs when patients facing death, and their family, have time to consider the meaning of their lives, make plans, and shape the course of their living while preparing for death.

Nursing Care Plans

During end-of-life care, the nursing care planning revolves around controlling pain, preventing or managing complications, maintaining quality of life as possible, and planning in place to meet patient's and/or family's last wishes.

In this nursing care plan guide are 11 nursing diagnosis for the care of the elderly (older adult) or geriatric nursing or also known as gerontological nursing. Learn about the assessment, care plan goals, and nursing interventions for gerontology nursing in this post.

Gerontology nursing or geriatric nursing specializes in the care of older or elderly adults. Geriatric nursing addresses the physiological, developmental, psychological, socio-economic, cultural and spiritual needs of an aging individual.

Since aging is a normal and fundamental part of life. Providing nursing care for elderly clients should not only be isolated to one field but is best given through a collaborative effort which includes their family, community, and other health care team. Through this,

nurses may be able to use the expertise and resources of each team to improve and maintain the quality of life of the elderly.

Geriatric nursing care planning centers on the aging process, promotion, restoration, and optimization of health and functions; increased safety; prevention of illness and injury; facilitation of healing

Information Sheet 2- Prevention and control of NTDs

More than one billion of the world's poorest people are affected by neglected tropical diseases (NTDs), which are a group of parasitic, viral and bacterial infections that each year cause an estimated 534 000 deaths and a disease burden of 57 million disability-adjusted life–years (DALYs). The World Health Organization (WHO) advocates five strategies for preventing and controlling NTDs:

- ✓ preventive chemotherapy,
- ✓ intensified case management,
- ✓ control of disease vectors,
- ✓ provision of clean water and
- ✓ Sanitation and veterinary public health measures.

Historically, the development of drugs for these diseases has been limited by a lack of market incentives. More recently, the formation of public–private partnerships for drug development has increased investment in research and development but the results have been uneven, with some diseases benefiting more than others. For some NTDs, such as geohelminth infection, affordable and effective treatments do exist but their availability for people living in highly endemic areas is often limited. For many others, treatment is inconvenient, poorly tolerated and expensive. A rational and comprehensive approach to disease control may, therefore, involve: (i) prevention strategies, including combined preventive chemotherapy (i.e. the treatment of more than one disease by the mass administration of more than one drug concurrently); (ii) improved access to clean water and sanitation; and (iii) the reduction of disease transmission by insect vectors. In addition, integrating efforts to control several NTDs into a single programme may reduce costs and streamline implementation

SELF-CHECK -2	*WRITTEN TEST*

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

1. Discuss on Prevention and control of NTDs

Note: **Satisfactory rating – 2 points** **Unsatisfactory - below 2 points**

Answer Sheet

Score = _____

Rating: _____

Name: _____ Date: _____

Short Answer Questions

LG #7	LO #4- PERFORM DISEASE SURVEILLANCE

Instruction sheet

This learning guide is developed to provide you the necessary information regarding the following content coverage and topics:

- Integrated disease surveillance
- Active and passive surveillance procedures
- Organizing, analyzing and interpreting data
- Possible and probable cases definition
- Epidemic investigations and management
- Timely and complete reports
- Collecting and disseminating feedback

This guide will also assist you to attain the learning outcomes stated in the cover page. Specifically, upon completion of this learning guide, you will be able to:

- Describes Integrated disease surveillance
- Active and passive surveillance procedures
- Epidemic investigations and management
- Collecting and disseminating feedback

Learning Instructions:

1	Read the specific objectives of this Learning Guide.
2	Follow the instructions described below.
3	Read the information written in the “Information Sheets”. Try to understand what are being discussed. Ask your trainer for assistance if you have hard time understanding them.
4	Accomplish the “Self-checks” which are placed following all information sheets.
5	Ask from your trainer the key to correction (key answers) or you can request your trainer to correct your work. (You are to get the key answer only after you finished answering the Self-checks).
6	If you earned a satisfactory evaluation proceed to “Operation sheets
7	Perform “the Learning activity performance test” which is placed following “Operation
8	If your performance is satisfactory proceed to the next learning guide,
9	If your performance is unsatisfactory, see your trainer for further instructions or go back to “Operation sheets”.

INFORMATION SHEET-1 ***INTEGRATED DISEASE SURVEILLANCE***

Integrated disease surveillance.

Which consists of observation, recording and reporting of cases of important communicable diseases or conditions in the community? A good knowledge of public health surveillance will enable you to detect the occurrence of excess cases of communicable diseases and report them to the higher authorities. Using public health surveillance data, you can also assess the magnitude of major communicable diseases, by counting the number of cases occurring over a period of time. Collecting and analyzing public health data will help you to plan appropriate measures to control communicable diseases. This session will also cover the types of surveillance and the activities you will undertake in recording and reporting disease. You will learn more about the different kinds of epidemics investigation and management. A better understanding of epidemics will help you to detect an outbreak or epidemic of a communicable disease and report it immediately to the Health Center and/or District Health Office. You are expected to help the District Health Team in the control of any epidemics in your catchment area.

SELF-CHECK -1	*WRITTEN TEST*

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

1. Public health surveillance is Which consists of observation, recording and reporting of cases of important communicable diseases or conditions in the community(2point)

   A. True B. False

Note: **Satisfactory rating - 2 points** **Unsatisfactory - below 2 points**

You can ask you teacher for the copy of the correct answers.

Answer Sheet

Score = _____

Rating: _____

Name: _____ Date: _____

Short Answer Questions

INFORMATION SHEET-2 ***ACTIVE AND PASSIVE SURVEILLANCE PROCEDURES***

Active and passive surveillance: is a continuous data collection, data analysis, interpretation of the data, and dissemination of the information to concerned bodies. Health extension workers will routinely need to collect, analyze and interpret health-related data, and send reports of your findings to the nearby Health Center.

In addition, during an outbreak or epidemic of infectious disease, you will need to work with other health team members to actively find new cases in your catchment area. Surveillance provides 'information for action' which can be used to investigate, prevent and control disease in a community.

Active surveillance data are collected because the higher health authorities request a specific surveillance report, instead of waiting for Health Posts or other health facilities to send them routine reports. In this sense, it is the opposite of passive surveillance. Figure 40.6 shows the information flow under active surveillance in Ethiopia. The solid black arrows indicate that the FMOH, at the highest level of the health system, takes the first step and requests surveillance data from all lower levels of the health system. Intermediate levels contact those below, all the way down to the level of your Health Post. As the broken arrows show, your Health Post prepares the requested data and sends it back to the Health Centre, the Health Centre sends the data to the woreda District Health Office, and so on to the highest level. Note, that without a request from a higher level, the active surveillance report would not have been prepared and submitted.

Passive surveillance information flow in Ethiopia. The solid arrows show the initial route of information flow. The broken arrows show that contact and information can also flow in the opposite direction.

Passive surveillance is cheap to operate, because it takes place as part of routine health-service work, and it helps you and the higher authorities to monitor the occurrence of many diseases and other health problems. However, it has some

SELF-CHECK -2	*WRITTEN TEST*

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

1. Health extension workers will routinely need to collect, analyze and interpret health-related data, and send reports of your findings to the nearby Health Center.
   A.True B.False

Note: **Satisfactory rating - 25 points** **Unsatisfactory - below 25 points**

You can ask you teacher for the copy of the correct answers.

Answer Sheet

Score = _____

Rating: _____

Name: _____

Date: _____

Short Answer Questions

INFORMATION SHEET 3- *ORGANIZING, ANALYZING AND INTERPRETING DATA*

Organizing, analyzing and interpreting data surveillance There are three basic types of surveillance systems – passive, active and mixed surveillance – and you need to know about and do them all.

Passive surveillance: refers to the collection of data by health facilities as part of their routine work of diagnosis and treatment .It is called 'passive' because the data is obtained only from the people who seek help from the health services – the health workers make no additional effort to contact other individuals. In Ethiopia, there isapassive surveillance system based on monthly activity reports and weekly reporting of notifiable diseases, i.e. diseases that must be reported to the health authorities. Most communicable disease outbreaks should be reported by telephone or radio to your Health Centre.

Figure 3.1 A health worker collecting health data as part of her routine practice; here she is asking mothers about the immunization status of their infants.

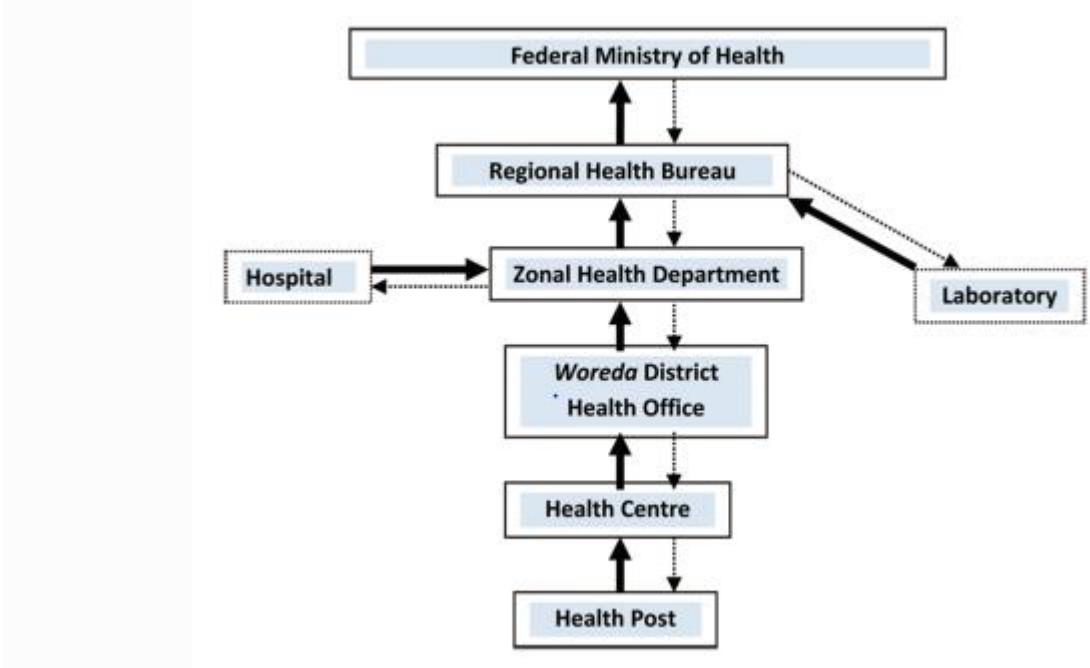


Figure 3.2. Passive surveillance information flow in Ethiopia. The solid arrows show the initial route of information flow. The broken arrows show that contact and information can also flow in the opposite direction.

Passive surveillance is cheap to operate, because it takes place as part of routine health-service work, and it helps you and the higher authorities to monitor the occurrence of many diseases and other health problems. However, it has some disadvantages. The surveillance reports may take a long time to reach the highest level, and some key information may be lacking (e.g. if the health worker forgets to collect data on a statistic such as the sex or age of some patients)

Active surveillance: The second type of surveillance is called active surveillance, in which the health professionals actively seek to collect data from all possible cases in their area, under instruction to do so from a higher level in the health system. Active surveillance is usually conducted in relation to a specific disease or disorder, or it seeks to assess the take-up of a particular health service (e.g. family planning, or immunization).

Active surveillance data are collected because the higher health authorities request a specific surveillance report, instead of waiting for Health Posts or other health facilities to send them routine reports. In this sense, it is the opposite of passive surveillance. Figure 40.6 shows the information flow under active surveillance in Ethiopia.

The solid black arrows indicate that the FMOH, at the highest level of the health system, takes the first step and requests surveillance data from all lower levels of the health system. Intermediate levels contact those below, all the way down to the level of your Health Post.

As the broken arrows show, your Health Post prepares the requested data and sends it back to the Health Centre, the Health Centre sends the data to the woreda District Health Office, and so on to the highest level. Note, that without a request from a higher level, the active surveillance report would not have been prepared and submitted.

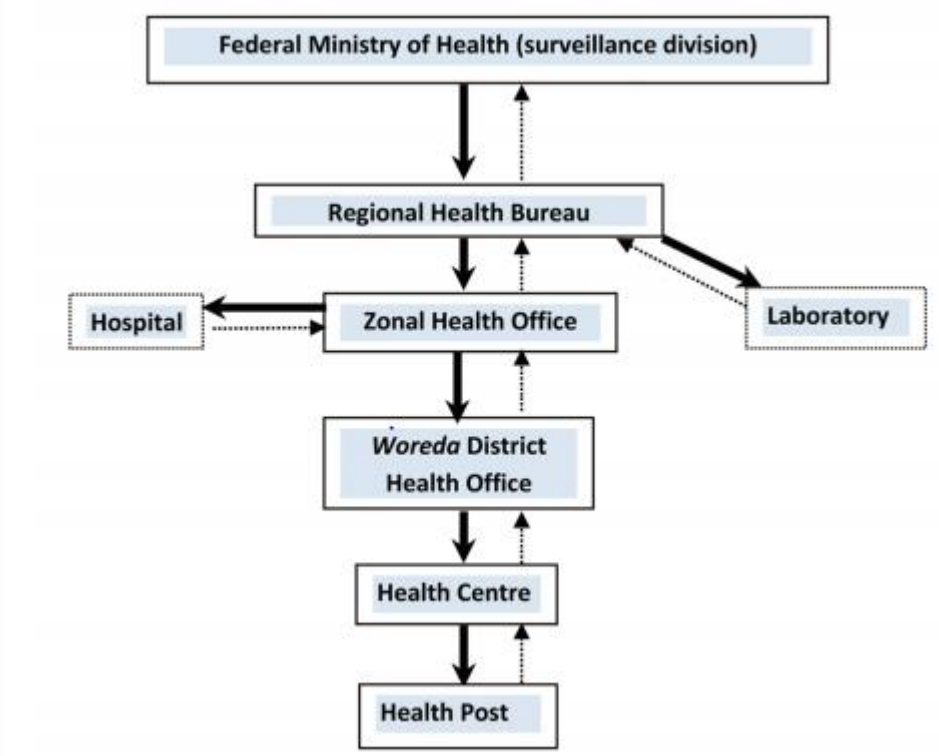


Figure 3.3. Active surveillance information flow in Ethiopia. The solid arrows show the initial requests for information. The broken arrows show how the requested information flows back up the system.

Active surveillance can also be a type of event-based surveillance, which refers to unstructured data gathered from sources such as media reports, community concerns and rumours. For example, if there is a rumour about a measles outbreak in your community, the Health Centre will ask you to report if there are any new cases of measles during a defined period of time.

Mixed surveillance Mixed surveillance means combining passive and active surveillance systems. This can work well, leading to better monitoring of communicable diseases and other health problems. Disease control programmers for HIV/AIDS, polio and malaria use a combination of passive and active surveillance systems.

SELF-CHECK -3	WRITTEN TEST

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

1. the collection of data by health facilities as part of their routine work of diagnosis and treatment is called(2point)

   A, Passive surveillance C. Mixed surveillance

   B. Active surveillance D. All

Answer Sheet

Score = _____

Rating: _____

You can ask you teacher for the copy of the correct answers

Name: _____ Date: _____

INFORMATION SHEET 4- *POSSIBLE AND PROBABLE CASES DEFINITION*

Data collection and recording: Gathering and recording data about diseases in your community is a very important activity. As part of your routine activity, you are expected to collect health data from patients when they come to your Health Post. You are also expected to collect data during home visits about illnesses and deaths due to major communicable diseases, as well as about other health-related factors such as nutrition, immunization coverage and use of family planning methods. During data collection, you should record basic information about patients, such as their age, sex, address, symptoms of the illness and suspected disease or disorder

Analysis and interpretation of public health data: Data analysis is the organization and systematic examination of the data you have collected. Data interpretation is the process of understanding and communicating the meaning of your data. These are the next steps in surveillance after data collection and recording. A useful analysis to carry out is to calculate the number and types of new cases of every disease or disorder, and see how the occurrence is changing over time.

Counting the number, percentage and types of cases: In order to count the number of cases of a particular disease or disorder, you need to be able to decide if a person really has that condition or not. To calculate the percentage of cases that are due to a particular disease or disorder, you divide the number of cases of that condition by the total number of cases of all diseases and disorders combined, and multiply the result by 100. Example, there were ten cases of TB patients the community of total population of 8000 in 2004. The total numbers of patients for all cases reported were 60. The percentage of TB cases is: 10 ÷ 60 × 100 = 16.6%. So 16.6% of all cases seen were due to TB.

Incidence rate The incidence rate is a very useful measure of the frequency of new cases of a disease or disorder occurring in your community over a given period of time (usually a year, month, or a week during new outbreaks). To calculate the incidence rate for a particular disease/disorder, you need to know: the total number of new cases of that condition seen in a particular population during the period you are interested in and the total number of people in the population you are interested in, during the same period. You divide the numerator by the denominator and multiply the result by 1,000. This is the traditional way of expressing an

incidence rate, as the number of new cases of the disease/disorder per 1,000 people in the population. Therefore; the incidence of TB cases in the above example is: 10 ÷8000 x 1000=1.25. Therefor the incidence of TB in a community A above in 2004 were about one in every 1000 population.

Analyzing public health data by person, place and time : The distribution of a disease can be described by recording which person was affected (who), the place where the case occurred (where) and the time when it occurred (when). Information about the person affected should include their age, sex, ethnic group, religion, occupation, and marital status. Place of illness may be household, kebele or woreda. Time of illness can be recorded as a day, week, month or year

Comparing data in different time periods: In order to assess your progress in preventing communicable diseases and other disorders in your community, it is essential to compare the incidence rate of each condition at different times (e.g. in the present year compared to the previous year). When the incidence of a disease has increased compared to the previousfigure, it may indicate an epidemic, so you should immediately report it to the Health Center and/or District Health Office. It is also important to describe the distribution of cases by age, sex and place of residence.

Reporting activities timely :After you have analyzed and interpreted your public health surveillance data, you should prepare a report and send it to your supervisor at the nearby Health Center. Use different reporting formats for monthly reportable, weekly reportable and immediately reportable diseases. The Health Centre or District Health Office will use your report for planning and allocation of resources, such as drugs and other Health Post supplies. They may also use the data to improve health services, assess the progress of activities of the health institutions and to control an epidemic

SELF-CHECK -4	WRITTEN TEST

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

1. Gathering and recording data about diseases in your community is(2point)
   A. Reporting C. interpretation of data
   B. Analyzing public health data D, Data collection and recording

Note: **Satisfactory rating – 2 points** **Unsatisfactory - below 2 points**

You can ask you teacher for the copy of the correct answers.

Answer Sheet

Score = _____

Rating: _____

Name: _____ Date: _____

Short Answer Questions

INFORMATION SHEET 6- *EPIDEMIC INVESTIGATION AND MANAGEMENT*

Outbreak and an epidemic: If there is an increase in cases of a disease compared with the expected number, but it lasts for only a short time, or it occurs only in a limited area, the rise may be referred to as an outbreak. Epidemic is also an excess of cases compared with the number expected; however, an epidemic is more general than an outbreak, the increase in the number of cases continues far longer (possibly months or even years), and the cases are distributed across a wider area. Malaria is the major vector-borne disease that causes epidemics in the months of June, September and October in Ethiopia. This is when the conditions are humid and warm enough and there are plentiful water collections for the vector mosquitoes to breed in

Types of epidemics: Epidemics are classified into different types according to the source of infection and modes of transmission. The two main modes of transmission of communicable diseases; direct modes of transmission, such as from mother to child, or from faecally contaminated hands into the mouth; and indirect modes of transmission, such as through vectors, contaminated air, water, food or objects such as cooking bowls and utensils. Based on these criteria epidemics are classified into three types: common source, propagated, and mixed outbreak.

Common source outbreaks: occur when the rise in cases of an infection occurs after a group of people all came into contact with the same unsafe source of infection (the common source), such as contaminated food or water. Example, if food prepared for students at college/University is contaminated. Many people may get illness. This kind of epidemic is called a common source outbreak.

A point source outbreak is a common source outbreak where the exposure period (e.g. the time at which the contaminated food was eaten) is short. This means that all cases who fall ill after eating the food (the common source) also have the same incubation period, i.e. the period between infection (eating the contaminated food) and the appearance of the first symptoms.

Propagated or progressive epidemics: occur when the infection spreads from person to person. The infectious agents causing the disease pass from one host to another, either directly from person to person (e.g. via hand shaking or kissing), or indirectly via vectors (e.g. mosquitoes in the case of malaria), or in water, food or another medium. The distribution of malaria cases is a good example of a propagated epidemic, because increased numbers of malaria cases occur again and again at different times. Propagated epidemics last longer than the common source outbreaks. This is because malaria will continue to spread in the community, as long as mosquitoes are present in the environment and there are people who carry the parasite. Can you think of any epidemic-prone diseases that spread quickly in overcrowded conditions where there is poor sanitation and personal hygiene?You may have thought of typhoid fever, cholera, shigellosis (bacterial dysentery), louse-borne relapsing fever and typhus.

Mixed epidemics: show characteristics of both common source and propagated epidemics. So a mixed epidemic can start with a common source and be followed by a propagated spread.

Mixed epidemics are often caused by food borne infectious agents. The organism that causes typhoid (Salmonella typhi) can survive in sewage for 14 days and in water for up to seven days. Water polluted by fecal matter is therefore the main source of infection for typhoid. If the whole community drinks water from the same water source, which has been contaminated with Salmonella typhi, there will be a common source out break of typhoid fever.

The epidemic may continue to spread through fecal matter passing from person to person, if the people in the affected community do not improve their standards of

personal hygiene, or if the water is not treated and made safe to drink. This type of spread of typhoid is called a propagated epidemic of typhoid.

Epidemic investigation: is a set of procedures used to identify the cause, i.e. the infectious agent, responsible for the disease. It is also used to identify the people affected, the circumstances and mode of spread of the disease, and other relevant factors involved in propagating the epidemic. This is especially important if the epidemic has unusual features, if it presents a significant threat to public health, and it is not self-limiting. Epidemic investigation is a challenging task for health workers. The main purpose of epidemic investigation is to control the spread of the disease before it causes more deaths and illness. As Health Extension workers, the first action you should take is to confirm the existence of an epidemic. To do this, you need to know the average number of cases of that disease during this specific month in your community in previous years, so you can compare that number with the current number of cases. Are there an excess number of casesor deaths from this disease compared to the usual occurrence? If there really are excess cases, you should report your findings to the District Health Office immediately.

Management of epidemics: Epidemic management activities include taking appropriate control measures, such as treating those who are ill to reduce the reservoir of infection, and providing health education to limit the transmission of the disease to others. Health professionals at higher levels will require your help in putting into operation any measures needed to control the spread of the disease, such as giving drugs to people in the community and providing health education. As mentioned above, you may be involved in the management of an epidemic once it is confirmed by the health authorities. The type of control measures you need to implement depend on the type of infectious agent, how the disease is transmitted, and any other factors contributing to the disease.

Generally, your control measures should target the infectious agent, the source of any infection, and the treatment of those who became ill. If it is caused by contaminated water, you should educate them not to drink the water until it is treated with chlorine.

SELF-CHECK -6	WRITTEN TEST

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

1. If food prepared for students at college/University is contaminated and Many people may get illness. This kind of epidemic is called(2point)

   A/ a common source outbreak. B. Mixed epidemics

   C. Propagated epidemics D .progressive epidemics

Note: **Satisfactory rating – 2 points** **Unsatisfactory - below 2 points**

You can ask you teacher for the copy of the correct answers.

Answer Sheet

Score = _____

Rating: _____

Name: _____ Date: _____

Short Answer Questions

INFORMATION SHEET 7- *TIMELY AND COMPLETE REPORTS*

Introduction: In this session, we will consider the Integrated Disease Surveillance and Response (IDSR) system. IDSR involves carrying out disease surveillance activities using an integrated approach. An integrated approach means that data on all important diseases will be collected, analyzed, interpreted and reported in the same way, by the same people who normally submit routine report forms on health-related data. In this study session, we will also consider the case definitions of priority diseases in Ethiopia, and how priority diseases are reported. Proper understanding of IDSR, the case definitions and reporting methods will enable you to identify, register, analyze and report priority diseases quickly and accurately to the proper authorities. These activities are essential in order to ensure that priority diseases in your community can be prevented and controlled.

Importance of the Integrated Disease Surveillance and Response (IDSR) system: IDSR brings many surveillance activities together to try and make sure that priority diseases can be controlled and prevented more effectively. The IDSR system requires that all important communicable diseases within a health facility are reported together, using the human and other resources already available within that facility. Collecting, analyzing and reporting priority diseases in this way have several advantages:

It is cheap, since the same health personnel and reporting formats are used as are also used for routine reports of health-related data. It creates an opportunity to computerize all the available data at the central level.

It provides training and capacity building opportunities for health personnel to develop new

Skills. It encourages community participation to detect and respond to disease epidemics.

Thus, IDSR is a cost-effective surveillance system which addresses the major health problems of Ethiopia. IDSR is a passive surveillance system as the data used are

collected during routine health work. Active surveillance, on the other hand, uses data collected after a request from higher authorities for specific information.

Role of the Health Extension Practitioner in IDSR: As a Health Extension workers working and living in a community, you are likely to know the residents well. Your relationship with the community is very important and should help you in Role of the Health Extension Practitioner in IDSR As a Health Extension workers working and living in a community, you are likely to know the residents well. Your relationship with the community is very important and should help you in

Role of Health Extension Practitioners in IDSR activities Your

Roles are to:

- ✓ Identify cases of priority diseases and conditions in the community by using case
- ✓ definitions. Report any cases or possible cases to the nearest Health Centre as soon as possible.
- ✓ Study suspected cases, identify everyone who is affected, and determine where and when
- ✓ the disease is most common. Actively search for other cases in the community by doing home visits; inform the community about cases in the area and work with community members to find more cases. Assist the District Health authorities to treat cases and to control the spread of the disease.
- ✓ Mobilize and educate the community to prevent the disease from spreading.
- ✓ Keep your community informed about the cases that have been identified and how they are being managed

Case definitions of priority diseases: A case definition is a set of standard criteria used to help you to separate true cases (those with the disease) from suspected cases that do not have the disease. Health workers in Hospitals and Health Centers should use

standard case definitions for reporting suspected priority diseases, i.e. a definition that has been agreed and should be used by all health professionals at higher levels within the country. Standard case definitions should be applied in the same way to all the persons examined. Standard case definitions classify cases as confirmed or suspected. A confirmed case shows all the typical symptoms of a disease and the infectious agent or other cause has been positively identified in a laboratory investigation. For example, in a confirmed case of malaria, the patient shows symptoms typical of malaria, such as fever, headache and joint pain, the rapid diagnostic test (RDT) is positive, and laboratory investigation of a blood smear has confirmed that the person is infected with the Plasmodium parasites that cause malaria. On the other hand, a suspected case of malaria means that the person shows symptoms of malaria, but a laboratory investigation either has not been conducted yet, or has failed to find evidence of the parasite that causes malaria. A community case definition is a simplified version of the standard case definition, adapted to suit the needs and resources of Health Extension Workers, community health volunteers, community members, traditional healers and birth attendants. It is useful to make a poster showingthese definitions for the Health Post wall in the local language.

Reporting of priority diseases : Complete and reliable reporting of surveillance data throughout the country is vitally important, so that program managers, surveillance officers and other health care staff can use the information for action.

Immediately reportable diseases: Of the 20 priority diseases, thirteen must be reported immediately to the next reporting level.

For these immediately reportable diseases, a single suspected case could signal the outbreak of an epidemic, so it is important to report any cases or suspected cases to the

next level of the reporting hierarchy within 30 minutes. This means you should report cases to the nearest Health Centre within 30 minutes, the Health Centre reports to the District Health Office within 30 minutes, and so on up to the highest national Level. When you encounter a case of an immediately reportable disease, first report the information verbally or by telephone, or by sending a text using the SMS short message service. An official written report using the modified case based reporting format should follow immediately after the verbal report. You should remember to record the affected person's address, age, sex, vaccination status and symptoms. You should also suggest a possible diagnosis that is, which of the 13 immediately reportable diseases you suspect. The date of referral and your signature should also be on the reporting form. After completing the form, you should immediately send the patient to the Health Centre and check by telephone to confirm the arrival of the patient at the Health Centre

Weekly reportable diseases: Currently, seven diseases and conditions are identified to be reported weekly to the next reporting level. Reports should include the total number of cases and any deaths seen during the week. Reports should be sent to the Health Center every Monday, using the weekly reporting format. In this format, you are expected to record the name of the disease, as well as the age and sex of the patient, and the place where the case was diagnosed (Health Post or community). For suspected cases of malaria, the laboratory result based on the Rapid Diagnostic Test (RDT) should also be recorded

SELF-CHECK -6	***WRITTEN TEST***

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

1. Weekly reportable diseases is only the total number of any deaths seen during the week.(2point)

   A. True B, False

Note: **Satisfactory rating – 2 points** **Unsatisfactory - below 2 points**

Answer Sheet

Score = _____

Rating: _____

Name: _____ Date: _____

Short Answer Questions

LG #8	LO #5- FOLLOW UP OF CASES

Instruction sheet

This learning guide is developed to provide you the necessary information regarding the following content coverage and topics:

- Monitored and reporting side effects of drugs
- Ensuring compliance of drugs
- Tracing defaulters given advice
- Ensuring adherence
- Follow up of ART and other cases

This guide will also assist you to attain the learning outcomes stated in the cover page. Specifically, upon completion of this learning guide, you will be able to:

- Discribes Monitored and reporting side effects of drugs
- Ensuring compliance of drugs
- Tracing defaulters given advice
- Ensuring adherence
- Follow up of ART and other cases

Learning Instructions:

1. Read the specific objectives of this Learning Guide.
2. Follow the instructions described below.
3. Read the information written in the “Information Sheets”. Try to understand what are being discussed. Ask your trainer for assistance if you have hard time understanding them.
4. Accomplish the “Self-checks” which are placed following all information sheets.
5. Ask from your trainer the key to correction (key answers) or you can request your trainer to correct your work. (You are to get the key answer only after you finished answering the Self-checks).
6. If you earned a satisfactory evaluation proceed to “Operation sheets
7. Perform “the Learning activity performance test” which is placed following “Operation sheets” ,
8. If your performance is satisfactory proceed to the next learning guide,
9. If your performance is unsatisfactory, see your trainer for further instructions or go back to “Operation sheets”.

INFORMATION SHEET 1- MONITORING AND REPORTING ACTIONS AND SIDE EFFECTS OF DRUGS

1.1. Monitoring and reporting actions and side effects of drugs

Health care members continuously watch the patients and record all the events observed when a drug or different drugs are administered. In this, defined groups of patients are screened to detect ADRs

Healthcare systems rely mainly on the detection and reporting of suspected ADRs to identify new reactions, record the frequency with which they are reported, evaluate factors that may increase risk and provide information to prescribers with a view to preventing future ADRs, shows that adverse drug reaction are by.

report all serious suspected reactions to established drugs and report all suspected reactions (including those considered not to be serious) to drugs showing the black triangle symbol (usually newly licensed medicines).

How common are adverse drug reactions?

About 3 to 7% of all hospital admissions in the United States are for treatment of adverse drug reactions. Adverse drug reactions occur during 10 to 20% of hospital admissions, and about 10 to 20% of these reactions are severe.

Some common examples mild adverse effects related to drugs include:

- ✓ Constipation.
- ✓ Skin rash or dermatitis.
- ✓ Diarrhea.
- ✓ Dizziness.
- ✓ Drowsiness.
- ✓ Dry mouth.
- ✓ Headache.

- ✓ Insomnia.

Different drugs, different effects

Drugs affect your body's central nervous system. They affect how you think, feel and behave. The three main types are depressants, hallucinogens and stimulants:

Depressants slow or 'depress' the function of the central nervous system. They slow the messages going to and from your brain. In small quantities depressants can cause a person to feel relaxed and less inhibited. In large amounts they may cause vomiting, unconsciousness and death. Depressants affect your concentration and coordination, and slow your ability to respond to situations. It is important to not operate heavy machinery while taking depressants. Alcohol, cannabis, GHB, opiates (heroin, morphine, codeine) and benzodiazepines (minor tranquillisers) are examples of depressants.

Hallucinogens distort your sense of reality. You may see or hear things that are not really there, or see things in a distorted way. Other effects can include emotional and psychological euphoria, jaw clenching, panic, paranoia, gastric upset and nausea. Ketamine, LSD, PCP, 'magic mushrooms' and cannabis are examples of hallucinogens.

Stimulants speed or 'stimulate' the central nervous system. They speed up messaging to and from the brain, making you feel more alert and confident. This can cause increased heart rate, blood pressure and body temperature, reduced appetite, agitation and sleeplessness. In large amounts stimulants may cause anxiety, panic, seizures, stomach cramps and paranoia. Caffeine, nicotine, amphetamines (speed and Ice), cocaine and ecstasy (MDMA) are examples of stimulants.

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Drug use can also result in long-term health outcomes that include:

- ✓ harm to organs and systems in your body, such as your throat, stomach, lungs, liver, pancreas, heart, brain, nervous system
- ✓ cancer (such as lung cancer from inhaling drugs)
- ✓ infectious disease, from shared injecting equipment and increased incidence of risk-taking behaviors
- ✓ harm to your baby, if you are pregnant
- ✓ acne, or skin lesions if the drug you are taking causes you to pick or scratch at your skin
- ✓ needle marks and collapsed veins, if you inject regularly
- ✓ baldness
- ✓ male pattern hair growth in women, such as facial hair
- ✓ jaw and teeth issues due to clenching and grinding your teeth; or bad breath, teeth cavities and gum disease
- ✓ mood swings and erratic behavior
- ✓ addiction
- ✓ psychosis (losing touch with reality)
- ✓ accidental overdose
- ✓ higher risk of mental illness, depression, suicide and death.

Effects of common drugs

Cannabis (hash, pot, dope, weed, grass, skunk, marijuana):

- ✓ may cause relaxation and altered perception
- ✓ can lead to increased heart rate and low blood pressure
- ✓ can make you feel relaxed and happy, but can also cause lethargy, anxiety, paranoia, and psychosis in extreme cases. A history or family history of mental illness may increase the possibility of more extreme psychotic reactions
- ✓ is linked to mental health problems such as schizophrenia and, when smoked, to lung diseases such as asthma, chronic bronchitis and lung, throat, mouth and tongue cancer
- ✓ affects how your brain works. Regular use can make it hard for you to concentrate, learn and retain information
- ✓ reduces your fertility
- ✓ when mixed with tobacco, is likely to increase the risk of heart disease and lung cancer.

Cocaine (powder cocaine, coke, blow, Charlie, crack):

- gives you increased energy
- makes you feel happy, awake, confident and less inhibited, but has a nasty 'come down' that makes you feel depressed and unwell. (Using depressant drugs to help with the severity of come downs can increase the chances of the development of negative cycles of dependence.)
- can over stimulate the heart and nervous system and lead to a seizure, brain haemorrhage, stroke or heart attack (people have died from cocaine-induced heart failure)
- reduces your pain perception and may result in injury

- carries greater risk if mixed with alcohol or other stimulants, especially if you have high blood pressure or if you have an existing heart condition
- can harm your baby during pregnancy, and may cause miscarriage
- can increase the risk of mental health issues such a s anxiety, paranoia and psychosis
- if snorted, can cause damage to the lining of the nasal passage and nose
- if injected, can cause vein collapse and increased risk of HIV and hepatitis infection

Side effect is usually regarded as an undesirable secondary effect, which occurs in addition to the desired therapeutic effect of a drug or medication. Side effects may vary for each individual depending on the person's disease state, age, weight, gender, ethnicity and general health

Patient Reporting of Side Effects. The HPRA encourages patients, careers and other members of the public to report suspected adverse reactions (side effects) to us..

It is important that you also contact your doctor or pharmacist if you think you may have experienced a side effect after using a medicine. Safety Reporting Portal.

Vaccines For use by health professionals, consumers, and patients. Vaccine Online Reporting: Animal Food, Drugs and Devices For use by industry, veterinarians and animal ...A side effect is usually regarded as an undesirable secondary effect, which occurs in addition to the desired therapeutic effect of a drug or medication. Side effects may vary for each individual depending on the person's disease state, age, weight, gender, ethnicity and general health.

Side effects can occur when commencing, decreasing/increasing dosages, or ending a drug or medication regimen. Side effects may also lead to non-compliance with prescribed treatment. When side effects of a drug or medication are severe, the dosage may be adjusted or a second medication may be prescribed. Lifestyle or dietary changes may also help to minimize side effects.

gram should be obtained from the medical staff, nursing staff, quality improvement staff, medical records department, and risk managers.

The pharmacist should facilitate

1.Analysis of each reported ADR

2.Identification of drugs and patients at high risk forbeing involved in ADRs

3.The development of policies and procedures for the

ADR-monitoring and reporting program

4.Adescription of the responsibilities and interactions

of pharmacists, physicians, nurses, risk managers, and other health professionals in the ADR program

5.Use of the ADR program for educational purposes

6.Development, maintenance, and evaluation of ADR records within the organization

7.The organizational dissemination and use of information obtained through the ADR program

8.Reportingof serious ADRs to the FDA or the manufacturer (or both)

9.Publicationand presentation of important ADRs to the medical community

Direct patient care roles for pharmacists should include patient counseling on ADRs, identification and documentation in the patient's medical record of high-risk patients, monitoring to ensure that serum drug concentrations remain within acceptable therapeutic ranges, and adjusting doses in appropriate patients (e.g., patients with impaired renal or hepatic function).

SELF CHECK	SHORT ANSWER

Name: _____Date: _____

Directions: Answer all the questions listed below. Use the answer sheet provided in the next page.

1. Which **side effects** to **report**?
2.
3. What is the side effect of drug?

4. Which one of the following is true about side effect of drug?

a. A **side effect** is usually regarded as an undesirable secondary **effect.**
b. **Side effects** may vary for each individual depending on the person's ,

c. ADR definition used. **drugs**" and "all **effects** of psychoactive **drugs** can be produced naturally and spontaneously.

d.all are the answer

Answer Sheet

Score = _____

Rating: _____

Name: _____ Date: _____

Short Answer Questions

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